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Henry C. Pearson, F. R. G. S., Founder

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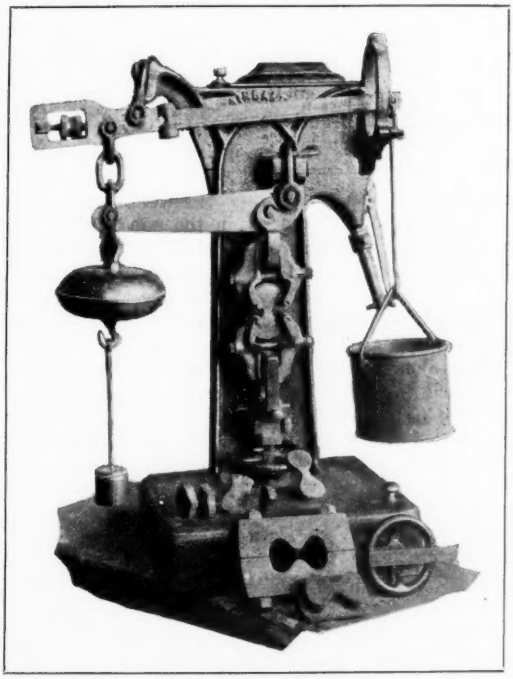
RUBBER *in the* Grinding Wheel Industry

JOSEPH N. KUZMICK[1]

FEW people realize the commercial importance of the modern grinding wheel. This can readily be appreciated, as reliable estimates show that today's $1,000 automobile would cost in the neighborhood of $10,000 if it were not for the grinding wheel and automatic grinding machinery. Due to mass production and the development of highly specialized grinding machinery the grinding wheel has been called upon for results which a decade ago seemed impossible. Artificial abrasives have featured in this development, as the modern grinding wheel would be impossible without these materials. Although not generally known, rubber has played an important part in this gigantic industry, in the form of a hard rubber binder for the abrasive granules.



Briquette Testing Machine

Briefly, a grinding wheel consists of granular abrasive particles bonded together by an inorganic or organic bond such as vitrified clay or sodium silicate for the inorganic, and rubber, shellac, or phenol resinoids for the organic. The abrasives used are crystalline alumina for metals of high tensile strength, such as steel and its alloys; while silicon carbide is used for metals of low tensile strength, such as copper, aluminum, chilled iron, and also in grinding or cutting granite, marble, glass, etc.

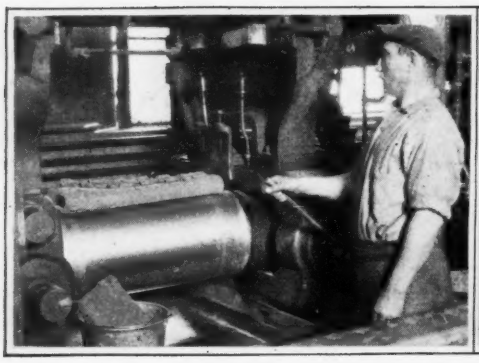
Silicon carbide (Si.C) is made in electric furnaces of the resistance type at a temperature of 4,000°F. or 2,200°C. The furnace is charged with coke, sand, sawdust, and salt (sodium chloride). Carbon is derived from the coke, and silicon from the sand, which unite to form silicon carbide. The sawdust merely makes the mass porous for the escape of gas, and the sodium chloride acts as a purifying agent.

Crystalline alumina (Al_2O_3) is made in a furnace of the arc type at a temperature of approximately 3,500°F. or 1,920°C. The furnace is charged with bauxite, which is fused and subsequently crystallizes. The pig of ore is then broken up, crushed, and graded.

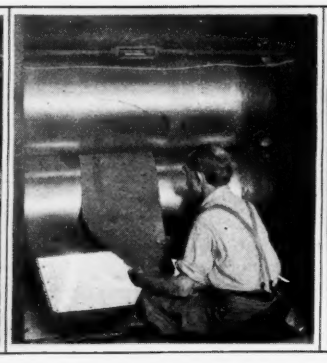
Of the several classes of grinding wheels in existence during the early days of wheel development, the rubber bond wheel was perhaps the one that gave the least promise of development as an efficient cutting medium in comparison with the clay bonded wheel. Notwithstanding its apparent disadvantages at the time, however, the rubber bond wheel has shown itself susceptible to development to a degree where it is now a formidable competitor of other types of grinding wheels.

The early rubber bonded grinding wheel contained a large amount of rubber, and in conjunction with the poor quality

[1]The Manhattan Rubber Manufacturing Division of Raybestos-Manhattan, Inc., Passaic, N. J. Paper read before the New York Group, Rubber Division, A. C. S., May 22, 1930. Publication permitted by *Ind. Eng. Chem.*



Mixing the Rubber and the Abrasive



Calendering Thin Wheel Stock

Punch Press for Thin Wheels

of the abrasive available at the time, its use resolved itself into a process of burning away a great deal of rubber to do comparatively little grinding, with the result that the odor of burning rubber was most generous. The one redeeming feature was its high strength compared with the clay bonded wheel, permitting the use of much higher peripheral speeds without danger of bursting.

Constant study and research have enabled the manufacturer of rubber bonded grinding wheels to produce wheels of extremely fast cutting ability, with practically no odor of rubber, and still preserve their characteristic strength.

Rubber bonded wheels now do a large variety of work, such as snagging the excess metal from steel castings with swing frame grinders, grind stands, and portable air tools.

Wheel Size	Usable Volume	CC Wheel Wear Per Kilogram of Metal Removed	Kilograms Removed Per Hour	Total Metal Removed Kilograms	Type of Wheel
457mm x 89mm x 51mm	9,096cc	36.4cc	2.95	250	Vitrified clay bond, grit 14, grade R.
610mm x 76mm x 304mm	14,669cc	37.9cc	13.38	387	Rubber bond grit 14, grade 12.

Because of the fine finish obtainable with rubber wheels, they are almost universally used in the grinding of ball bearing races, flutes of taps and auger bits. The grinding of hammers, axes, saw gumming, table cutlery, etc., are a few more examples.

Rubber bonded wheels now serve the granite industry in the form of cutting or slotting wheels. This is a new development which is rapidly replacing wheels bonded with shellac. This new, rubber bonded, granite-cutting wheel is so free cutting, yet strong and tough, that it is not uncommon to increase the depth of cut per pass as much as 500 per cent or 600 per cent as compared to wheels used heretofore.

The foregoing figures show an actual comparison between a vitrified clay bond snagging wheel and a rubber bond snagging wheel. For approximately the same wheel wear, the rubber bond wheel shows an increase of more than 400 per cent in cutting ability.

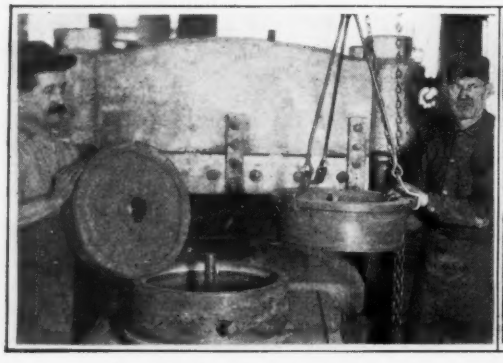
The compounding of the hard rubber base or bond, if not so prolific as the compounding of soft rubber, at least requires as much ingenuity, as the proper compound balance largely governs the strength and adaptability of the finished wheel to do the work for which it is intended.

Generally, long milled rubber is to be preferred. Normally about 40 to 50 per cent of sulphur based on the rubber is required, but in special cases this will vary from 25 to 75 per cent on the rubber. In the line of fillers, the oxides of metals are in the lead. Various softeners and emollients are used to good advantage, as a well plasticized base stock will have less tendency to crush the abrasive particles in the subsequent mixing operation. Owing to the long curing cycle a large percentage of compounds depends somewhat on inorganic accelerators. Certain special types, such as very thin slitting wheels which must be flexible yet tough and strong, call for judicious use of organic accelerators.

Briefly, the manufacture of rubber bond wheels is as follows:

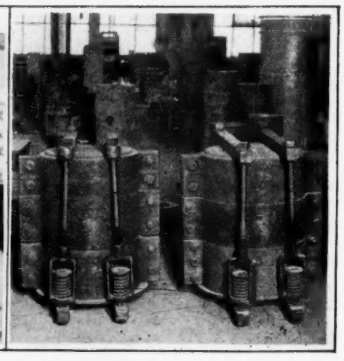
A sheet of compounded base stock of proper weight is laid in the pan beneath the rolls of a typical 2-roll mixer. A portion of a weighed quantity of abrasive of selected size is spread upon the sheet of base stock. The sheet is then folded over upon itself and passed through the rolls and allowed to drop into the pan. More abrasive is again spread upon the sheet and passed through the rolls. The remainder of the operation is a repetition of this, until all of the predetermined weight of abrasive granules is homogeneously mixed with the rubber.

In the manufacture of thin wheels the mixed batch is passed through the calender rolls, and the mixed sheet is re-

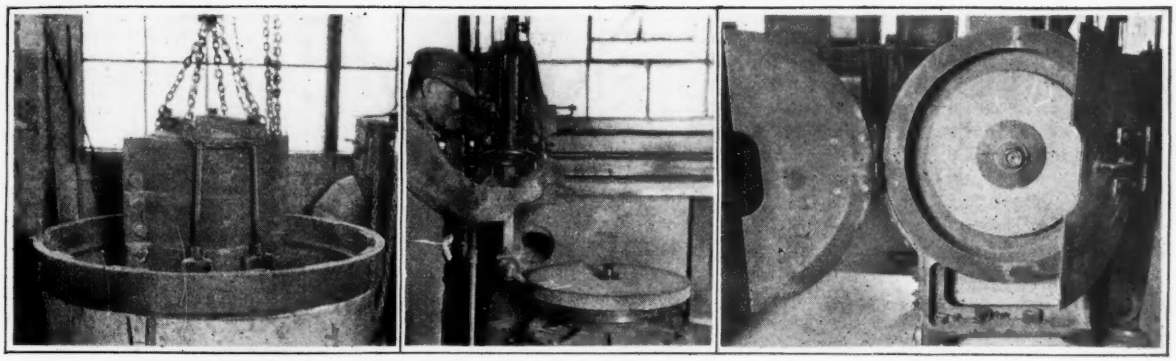


Wheel Ready for Pressing

Wheel After Pressing



Wheels in Vulcanizing Molds



Steam Vulcanizer | Wheel Being Trued on Lathe | Speed Testing of Finished Wheel

duced to the desired thickness from which the wheels are to be cut. Thin wheels are cut from this calendered sheet by means of a pneumatically operated punch press. Thicker wheels are cut out by a machine utilizing knives on a revolving bar adjustable for different diameters. In the manufacture of thick wheels, the thickness of the mixed sheet is governed by the spread of the mixing rolls. Due to the facility with which the material welds together under the influence of moderate heat and pressure, it is possible to make wheels of any desired thickness by superimposing any number of disks in a suitable mold and pressing them together in a hydraulic press at approximately 3,000 pounds per sq. in.

The pressed wheels are now confined in special curing molds and stacked upon each other in readiness for vulcanization. Vulcanization is carried out in steam vulcanizers or in specially constructed gas ovens with fans provided for the recirculation of hot air. Wheels vulcanized in steam are usually more elastic than those vulcanized in hot air. The curing cycle is 12 to 16 hours at 330°F. or 166°C.

The next step on the now-vulcanized wheels is that of dressing or truing. In this operation the wheels are brought to perfect roundness and the sides paralleled. This is accomplished by the use of diamond set tools on specially constructed lathes.

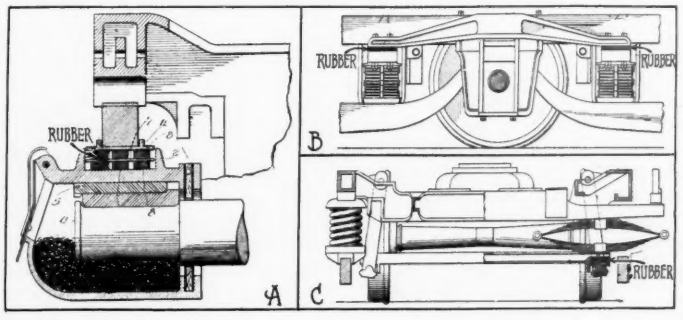
It can readily be appreciated that roll mixing as described has a tendency to shatter and dull a large percentage of the abrasive particles because of the crushing action of the rolls, resulting in a very dense and hard structure. Where extremely fast cutting wheels are desirable, it is essential to have a porous structure and not shatter and dull the abrasive particles. This can be accomplished by making a jell from the rubber base stock with a suitable solvent, such as benzol for example. The abrasive can then be mixed with this jell in a dough mixer, spread in molds of any desired size, and subsequently dried in a vacuum dryer to recover the solvent. The pressing and curing has been described.

Peripheral speeds of 9,000 to 10,000 surface feet per minute are commonly employed where rubber bond wheels are used. Owing to this high operating speed, any flaws or defects in the wheels would mean a potential source of danger to the workman using them, due to the hazard of bursting. Therefore, a test of 50 per cent over operating speeds, or approximately 15,000 surface feet per minute, is employed before the wheels are released for shipment to the user. The radial stress increases as the square of the velocity, and it will be seen that this test imposes a strain on the wheel of more than 100 per cent over its operating speed.

Factory laboratory control calls for routine testing and analysis of active ingredients. In connection with this work, standard figure-eight briquettes are molded from each batch of mixed material and are vulcanized with wheels made from that batch, resultant tensile strengths being recorded.

Rubber Cushioning Railway Cars

THE application of rubber for cushioning shocks and vibrations is being extended to the running gear of railway cars, with marked improvement in the comfort of passengers. The shocks and jars that result from the contact of wheel treads and flanges with the rails are transmitted through the wheels and parts of the truck to the car underframe and body. The application of rubber to cushion the vibrations in passenger car running gear is revealed by recently issued patents.[1]



The rubber cushion or pad used assumes any convenient form according to circumstances. One form consists of a center plate with an oblong rubber ring molded upon each side of it. Flanges are arranged to limit the expansible movement of the rubber ring on each side of the plate. Thus in addition to preserving good resilience the cushion is preserved against distortion and wear and tear.

Some of the points at which these cushions are applied are indicated in the accompanying group illustration.

This illustration represents details of car truck construction in each of which a rubber silencing pad is indicated.

A is a section through an axle journal box in which the rubber pad is boxed with a bearing plate upon which rests a pedestal that supports the vehicle frame.

B represents a side view of a car truck where rubber pads are interposed between the ends of a side bar and its supports.

C is a transverse section through a truck with the rubber pad located beneath the middle of an elliptical spring that is shown at the lower right part of the picture.

[1] U. S. Patent No. 1,762,886, No. 1,762,887, and No. 1,763,982, June, 1930.

Water Dispersions of Rubber

JOSEPH ROSSMAN, Ph. D.

A Survey of the United States Patents Relating to Water Dispersions of Rubber and Their Industrial Applications

ALMOST a hundred years ago, to be exact in 1836, British Patent No. 7,015 was obtained by R. W. Sievier for making an aqueous dispersion of rubber. He immersed rubber in a solution of ammonia for a long time and upon evaporation of the ammonia, a water dispersion of rubber was obtained. Also about this time Hancock was experimenting with direct uses of rubber latex.

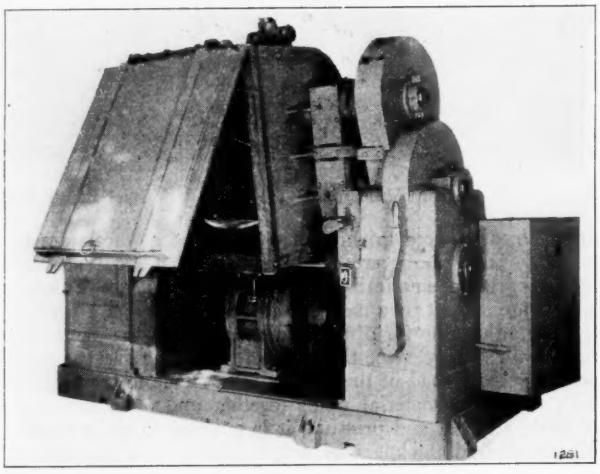
The direct use of rubber latex recently has led to a great interest in artificial water emulsions of rubber. In adding compounding ingredients to latex it was found necessary to add them in the form of suspensions or emulsions in water containing a protective colloid to prevent coagulation of the latex. It was, therefore, natural to attempt the preparation of artificial rubber latices using the same methods for incorporating compounding ingredients in rubber latex. These artificial latices usually consist of rubber or its solutions dispersed in water containing a hydrophylic protective agent. They are dispersions in which water is the continuous phase and where the protective agent has a greater affinity for the water than for the dispersed material.

The Alexander Process

AN INTERESTING U. S. Patent No. 821,394 issued in 1906 to Alexander describes a method of making a water dispersion of rubber which can be used for many purposes such as impregnating fabrics. One thousand kilos of rubber waste together with 3,000 kilos of benzene are heated to 150° C. from three to four hours in a closed vessel under pressure. The undissolved constituents are then mechanically removed. The solution is returned to the pressure vessel and heated to 150° C. for three hours, with 200 kilos of sodium hydrate in 350 kilos of water. The solution is then introduced into a retort and treated with steam as long as benzene passes off. The steam distillation is conducted so that a considerable portion of steam condenses in the vessel. The aqueous solution thus produced is filtered or separated by subsidence from mechanical impurities.

Alexander was rather puzzled by the transformation of the rubber and he made the following comments as to his conception of the chemistry involved: "Solutions of caoutchouc in an aqueous alkaline solvent were not known heretofore, and there is consequently no recognized theory by which the transfer of the caoutchouc from the hydrocarbon solvent to the alkaline aqueous solvent can be explained. It is believed, however, that during the process first a combination of the alkali with the caoutchouc is formed which has the property of being soluble in water."

Alexander also obtained another U. S. patent, No. 844,077, February 12, 1907, for an aqueous dispersion of rubber made by treating a benzene solution of rubber with caustic soda. The benzene is removed by steam distillation; the caustic soda is removed as a distinct layer, and the viscous rubber mass is stirred in water giving a satisfactory dispersion of rubber.



Day 100-Gallon Mogul Production Mixer for Water Dispersions

The Plauson Method

IN 1922 Plauson obtained U. S. Patent No. 1,432,895 for reclaiming waste rubber and forming a dispersion resembling rubber latex. The process consists in using a liquid dispersing agent, a substance of colloidal nature as accelerator of dispersion, and a saponifying and swelling agent or solvent. The following is an example of the process: 10 parts of ammonium sulphide, 1 part of caustic alkali, and 2 parts of potash soap are dissolved in 100 parts of water. At a temperature of 100 to 110° C. there is then added 10 parts of waste rubber from automobile tires in crumb or granular form. This mixture is then intensively mechanically distintegrated in a colloid mill. The mixture may be passed through a disintegrator of the beater type, in which the beater arms run in liquid at very high speed, and pumped into a reservoir, and then continuously circulated between the reservoir and the disintegrator. It is preferred, but not essential, to heat the reservoir and the liquid by steam to 100 to 110° C. The rubber and the liquid form a homogeneous mass even after disintegration for half an hour.

After one hour an emulsion-like appearance is observed, the free sulphur being extracted and present partly in the colloidal form and partly dissolved by the ammonium sulphide. The mixture may be cooled by the addition of cold water with continual disintegration, and the liquid containing the free sulphur in the colloidal and dissolved form may be removed by filtration and pressure or the sulphur can be extracted from the emulsion with organic sulphur solvents. Dispersion accelerators can also be added instead of soaps, and swelling agents or solvents are suitable for this purpose, such as, benzene, toluene, xylene, pseudo-cumene, mesitylene, tar oils, resin oils, vegetable oils, dichlorhydrin, aniline, toluidine, xylidine, phenol, cresol, etc. These substances can also be used in admixture with those specified above. By addition of 10 parts of benzene or xylene, etc., and 5 to 10 parts of caustic alkali, the extraction of sulphur can be performed without addition of ammonium sulphide.

The vulcanized soft rubber can be highly dispersed in ordinary water without addition of alkali if one of the above-mentioned dispersion accelerators, preferably colloids such as colophony, glue, gelatine, casein, protein, etc., is added together with 5 to 10 per cent of one of the specified hydrocarbons.

Pratt's Method

A GREAT deal of work has been carried on by William B. Pratt in making water dispersions of rubber. In U. S. Patent No. 1,755,890 recently issued, but filed in 1923, he disperses rubber in water by first dissolving the rubber in benzol and dispersing this solution in water by using soap. The benzol is finally extracted, leaving the rubber globules dispersed in water.

The following is an example of the process: After 100 parts, by weight, of crude rubber have been milled, there are now mixed with the rubber, 7 parts of flour of sulphur, 3 parts of zinc oxide, 2 parts of commercial MR, and a sufficient amount of any commercial accelerator such as ethylidene aniline, depending upon the time and extent of the cure subsequently to be effected. The milling is continued until a homogeneous mixture is obtained. The mass is now cut into relatively small pieces and churned in about 400 parts of commercial benzol. The agitation is continued until the rubber has swollen and formed a maximum solution with the benzol.

The sulphur and the mineral rubber dissolve in the benzol, but the pigment is in the solvent in the form of a fine suspension. During this action the globules of rubber, which were previously coagulated, separate and swell greatly. Ten parts of a saponifiable material, preferably oleic acid, are added although sulphonated oil or a vegetable oil may be employed if desired. This is stirred thoroughly into the mass and dissolved by the benzol and is more or less absorbed by the rubber globules.

Water, containing a saponificating agent, that is, ammonia, is now slowly and gradually stirred into the rubber solution until a change of phase has occurred and the water has become the continuous phase of the emulsion. In the event that ammonia is employed as the saponifying agent, in order to compensate or allow for evaporation, one uses about double the quantity theoretically required to saponify or neutralize the fatty acid of the saponifiable agent. If, however, other alkali, such as caustic soda or caustic potash be employed, care must be exercised not to use it in such excess as to effect the coagulation of the rubber; and, in the example given, there would be added to the water approximately 0.705 parts of caustic soda, the parts all being by weight. These operations may all be carried on at ordinary temperatures.

The mass produced as last described now has the benzol removed, preferably by vacuum distillation at a relatively low temperature, leaving the rubber globules and the compounding materials dispersed in the water. For some purposes it is desirable to remove more or less of the soap and a portion of the water, and to that end the mass is placed in a centrifugal machine like a cream separator. After the separation of water and soap, which may be effected several times or in several steps by diluting with water, the resulting rubber diffusion, a thick pasty mass, is produced having the general character of a thick smooth mud formed of smooth clay and water.

Elimination of Solvent

IN ANOTHER U. S. Patent No. 1,732,027 Pratt describes a method of separating and dispersing the globules of rubber in water without the necessity of first forming a solution of the coagulated rubber with a rubber solvent and thus avoiding the use of inflammable materials and the necessity of effecting a recovery of the solvent.

This method is based upon a theory explained by Pratt as follows:

"It is commonly known that rubber latex in its original state contains, in addition to water and the rubber globules, certain other substances in relatively small amounts, which are more or less akin to certain saponins, resins, proteins, and, possibly, fatty acids or their esters. In all likelihood the function of certain of these substances is to provide a film or protective coating for the individual globules in the latex by which their dispersion is maintained therein. In the process of coagulation of the globules these protective coatings doubtless become mechanically adherent, and when their facial contact with contiguous globules increases in area, the globules are physically distorted; and consequently there is formed a coherent mass which is capable of being manipulated on account of the mechanical adhesion of the globules through their protective coating.

"Many of these substances which are found in latex are water-soluble or water-absorbent, and in coagulation and drying, the water is removed. This may account for the fact that a mass of crude rubber, when worked with a certain amount of water, tends to swell, since the water may be reabsorbed by the water-soluble substances in the rubber, some of which form the protective coatings of the globules.

"It has been my theory that if water could be introduced into the rubber mass so as, by penetrating the interstices between the rubber globules, to restore the functions of the protective coatings, to reduce the interfacial tensions of the globules, and to permit the restoration of the globules to their original shape through the change in their surface tension, the rubber globules would become mechanically separated from adjacent globules. Under these conditions it should be possible for the rubber globules to be dispersed in water to the same extent to which these globules were dispersed in the original latex.

"With the removal from the latex of the water from the water-soluble substances (some of which, as stated, I believe form the protective coatings of the terpene centers of the globules), these water-soluble substances greatly increase in tensile strength and the globules are bound together more tightly; and, conversely, when they again absorb water, this tensile strength is decreased so that the mechanical adhesion of the protected globules is decreased, and they then perform substantially the function of a protective film or coating for the terpene centers of the globules."

The process comprises two steps, first incorporating water with or without a water-carrying colloid into the mass of crude rubber and then dispersing the mass in water so as to produce a product of the desired consistency, consisting of water as the continuous phase, and rubber globules as the dispersing phase of the dispersion.

In carrying out the process 550 parts of coagulated crude rubber are milled until the rubber becomes warm and plastic. To this add 27.5 parts, by weight, of glue, representing 5 per cent by weight of the mass of rubber. The mixture is milled until the glue is thoroughly incorporated in the rubber. The glue may be any of the commercial water-soluble or water-carrying glues, and it may be added either in the dry granular form or else in the form of a thick paste made by heating together the glue with a small quantity of water. The rubber glue is then transferred to a suitable mixing machine, sufficient water to bring the total water content up to about 10 per cent by weight of the rubber is added, and the mixer is covered and then allowed to run until the rubber has absorbed all of the water. During this operation of absorption of water by the rubber, the latter becomes quite warm.

A solution of 1 part of saponin to 2 parts of water is prepared. Of this solution take 82.5 parts by weight, representing 5 per cent of saponin and 10 per cent of water, both percentages based on the weight of the rubber, and after

heating, add the same slowly until the rubber mass assumes a putty-like condition. The balance of the saponin solution is gradually added and the entire mass finally and gradually diluted with approximately 250 parts of hot water. The mixing is continued until the water is thoroughly incorporated throughout the mass; whereupon it will be found that a smooth paste is produced in which the rubber has been dispersed in the form of globules. This rubber dispersion may be stored in this condition or it may be diluted with water to any desired consistency.

This dispersed rubber has many uses such as in coating fabrics, in cements, paper making, artificial leather, patching seams, in making dipped rubber goods, and even in chewing gum.

(*To be continued*)

Caro Process Fabrics[1]

Automatic Mass Production of Cloth on Patent System of Construction—Spinning and Weaving Displaced by Needling Effect—Labor Economy 85 Per Cent—Application of the Goods in Rubber Footwear and Clothing

THE ancient art of weaving still remains a system of interlacing of warp and weft yarns accomplished on a loom. Within a very few years, however, a revolutionary departure has been made in fabric construction involving radical changes in the preparation of the fibers and their structural combination into cloth. This method is radically unlike any that has preceded it and is accomplished by a fully automatic machine at astounding speed and unprecedented saving of labor cost.

The fabrics are made in a continuous operation from the raw material to the cloth. The output of the fabric begins about twenty minutes after the raw material is fed into the machine, which continues thereafter to manufacture cloth at the rate of three lineal yards per minute, the width depending upon that of the machine used. The whole object of the process is to reduce production costs, and the extent to which this object has been achieved is indicated by the saving of 75 per cent mill construction space, 60 per cent of power, and 80 per cent of labor cost.

The machine, which is electrically driven is ordinarily 175 feet long by 11 feet wide, manufacturing cloth from 36 to 108 inches in width. It is made up in three divisions and so constructed as to insure continuous operation in the event of any one of the three divisions being temporarily stopped.

Following their machine construction, the goods are finished by the regular processes for finishing woven materials.

The variety of fabrics producible by this machine has much interest for the rubber industry, particularly in the footwear section where warmth and external appearance are featured. The goods can be utilized as linings and exterior finish for warm rubber boots, arctics, and gaiters for winter wear. They also apply in the clothing section where heretofore it has been impractical to produce garments both waterproof and warm.

Raincoats, while very attractive in style and color, are essentially mild weather garments primarily for protection against rain. If used in winter, one must wear them over a heavy coat or woolen sweater for comfort. Thus a warm rainproof coat is especially desirable for winter wear by policemen, firemen, letter carriers, mariners, lumberjacks, teamsters, telephone and telegraph linemen, hunters, and many other all-weather out-of-door workers. Such clothing can now be constructed of two-ply cloth easily and cheaply proofed and united by a rubberized center. Thus the rubber manufacturing industry may enlarge its scope and effect economies by utilizing this new fabric construction.

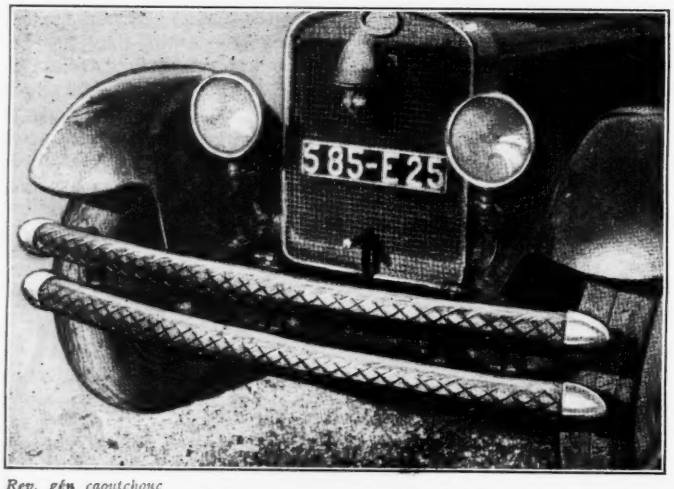
[1] Data from Ovington & Co., 120 Broadway, New York, N. Y.

Pneumatic Automobile Bumper

Rubber Crash Absorber of French Design

THIS shock absorber combines the flexibility of bumpers with that of a pneumatic tire. It is comprised of a metal band or rim, curved according to a specified radius, casing of fabric and rubber, with attaching beads, and an inner tube inflated to 4.4 pounds' pressure.

Three metal fittings are attached to the rear of the rim, one in the center and one at each end. In each of these fittings a housing is devised for the passage of a spring-plate. The plate is stationary in the center and sliding at each end so that it can expand in case of shock. The attachments to the chassis are arranged as in the usual existing metal bumpers.



Rev. gén caoutchouc

The Barre Automobile Bumper

The pneumatic bumper is made in two models: for small vehicles, as described above, and for large vehicles. The latter model comprises two pneumatics joined by the three attaching parts described above, with spring-plate in the center between them. The combined use of the elasticity of the metal and the flexibility of the casing and tube should make this bumper an efficient shock absorber.

Automatic Control of SURFACE TEMPERATURES for Laboratory Mixing Mills

R. L. MOORE and P. M. TORRANCE[1]

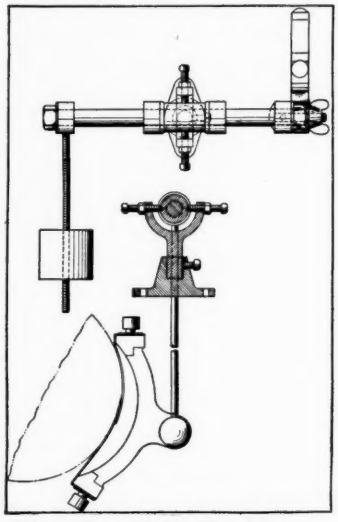


Fig. 1. Bracket Holding Thermocouple, Levers, and Counterweight

IT HAS long been recognized that variation in the physical properties of laboratory milled rubber compounds has been due in part to poorly controlled mill roll temperatures. The method developed by the DuPont laboratory,[2] of circulating a large volume of constant temperature water through the rolls, has done much toward eliminating this variable; but it is open to the objection that there is a considerable rise in the surface temperature of the mill rolls during the milling of a stock, and that this rise varies appreciably with the size and nature of the batch. This objectionable feature is due to the following causes:

1. Quite a large time lag is present, and a considerable temperature differential is built up between the outside and the inside surfaces of the roll before the frictional heat from the batch penetrates so that the constant temperature water can have a cooling effect; and some such differential is maintained throughout the batch or as long as a cooling effect is required.

2. The temperature differential between the inside surface of the roll and the constant temperature water is never very large, and consequently any cooling effect is necessarily quite slow.

The system described here, which minimizes time lag and utilizes a maximum temperature differential between cooling water and mill roll, has been in use in this laboratory for over a year and has been so satisfactory that it was felt that it might be of general interest.

The apparatus is actuated by two iron-constantan, ribbon thermocouples that are in contact with the surfaces of the mill rolls just beyond the edge of the sheet of rubber formed when a batch is being mixed. (One mill guard has been moved approximately an inch away from the ends of the rolls to make this possible.) These are connected to a two-point recorder-controller[3] (range 0° to 300° F.). The controller contacts of this instrument are connected in turn to two solenoid valves[4] located in the cooling water lines of the mill rolls. Figure 1 shows the bracket used to hold the thermocouple and the levers and counterweight that maintain contact with the mill roll, Figure 2 the method of installing this device on the mill, and Figure 3 a simplified wiring diagram of the apparatus. Figure 4 is a photograph of a chart made by the two-point recorder-controller while several batches were being mixed. It shows the rise in temperature while the mill rolls were being heated by steam, the drop back to proper temperature brought about automatically by the apparatus, and the maximum variation in roll surface temperature from 154° F. to 160° F. during the milling. (The apparatus was set for 157° F.)

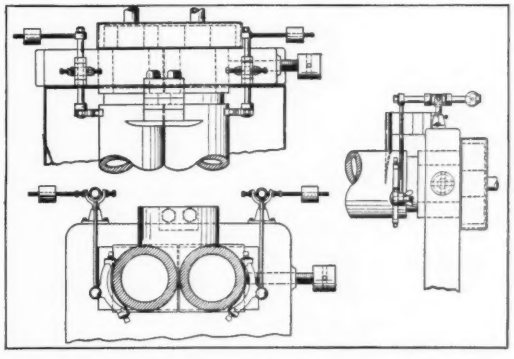


Fig. 2. Method of Installation on a Laboratory Mill

The mechanism operates as follows: The mill rolls are brought to operating temperature before milling by turning steam into them through manually operated valves. For the sake of simplicity and because it is necessary to provide only a cooling effect during the actual milling of normal sized batches, this heating mechanism was not incorporated in the automatic part of the apparatus. As the temperature rises past the point for which the apparatus is set, the operator turns off the steam and the recorder-controller automatically turns on the cooling water until both rolls are brought back to the temperature it is desired to maintain constant. At this time the milling is started. As frictional heat from the batch raises the surface temperature of the rolls past the desired point, the instrument turns on the cooling

[1] Thermatomic Carbon Co., Pittsburgh, Pa.
[2] INDIA RUBBER WORLD, Vol. 77, p. 61, Jan. 1, 1928.
[3] Leeds & Northrup Co., Philadelphia, Pa.
[4] Minneapolis Heat Regulator Co., Minneapolis, Minn.

water (each roll is taken care of independently) until the surface temperature drops again to the proper place.

Due to the fact that there is a time lag in the cooling effect coming through the steel rolls, there is necessarily some fluctuation in roll surface temperature; but this does not amount to more than 6° F. total (3° F. on either side of the proper temperature) and is the same for all types and sizes of batches. Normal procedure is to mill one batch after another until all are finished for it is necessary to heat up again if the mill is allowed to cool between batches.

The two-point recorder-controller is essentially a self-balancing potentiometer, calibrated in this case in terms of degrees as indicated by iron-constantan thermocouples. The heart of this instrument is a sensitive galvanometer, the needle of which is deflected whenever the potentiometer circuit is out of balance as is the case when there is a change in the temperature of the thermocouples. The end of this needle, when so deflected, is engaged by an ingenious system of multiplying levers and a clutch operated by a constant speed electric motor in such a manner as to turn the slide wire drum of the potentiometer circuit in that direction which tends to balance the circuit, the degree of turning depending on the magnitude of the needle deflection. This continues step by step until the system is balanced and the needle no longer deflected. The recorder pen is operated by the same shaft that turns the slide wire drum, as is the drum that operates the control contacts.

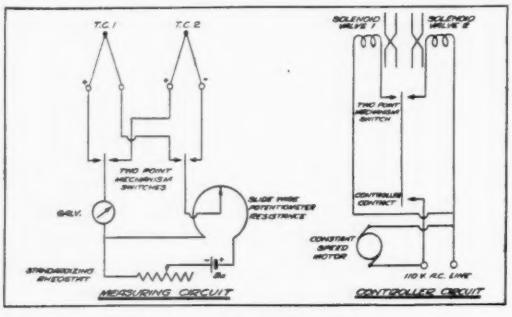


Fig. 3. Wiring Diagram

The two-point mechanism consists of a number of switches operated by the constant speed motor, that change the connections of the instrument back and forth from one controlled point to the other at suitable short intervals. That is, they cause the machine to divide its time between the two points. When this mechanism connects the machine to the thermocouple of one roll, the machine balances itself at a point corresponding to the temperature of the roll, and, if that temperature is above the desired one, closes the control contacts causing the magnetic valve in the proper water line to open, thereby cooling the roll. When the two-point mechanism switches the machine to the thermocouple and valve fitted to the other roll, the machine again balances itself and turns on cooling water if the temperature is above that for which the instrument is set.

Due to their small mass and large area of contact, the ribbon thermocouples have been found to be most responsive. When lifted from the mill roll surface and allowed to cool through 20 degrees F. in the air, they will, on being replaced, indicate the proper temperature again in less than thirty seconds with the mill at a standstill. The method of mounting allows the use of such a light bearing pressure against the roll that frictional heat developed at the point of contact causes no noticeable difference in indicated temperature between the mill running and at a standstill. These ribbon couples have been found to be surprisingly sturdy, their life being from six months to a year of daily use. When they do fail, replacement is a very simple and inexpensive matter.

Summarizing, an apparatus has been devised that will maintain the surface temperature of rubber laboratory mixing mill rolls constant within 3° F. of the desired temperature.

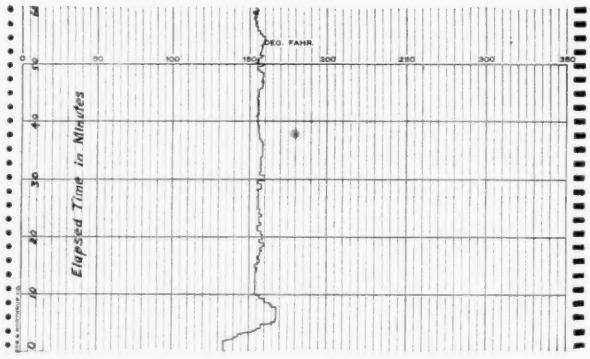


Fig. 4. Chart Made by the Two-Point Controller

It has been in use in this laboratory for over a year and has been found to be quite accurate and durable. It should be of considerable use in eliminating variation in the physical properties of laboratory milled rubber compounds.

NOTE. Working drawings and detailed instructions for the installation and adjustment of this apparatus will be gladly furnished on request. The writers wish to acknowledge the assistance of Carroll Miller in the design of this apparatus.

Why Rubber Colors Fade

GEORGE RICE

EVIDENTLY the French place more stress upon human perspiration as a deterrent of color fastness on rubber goods than most other people. When purchasing some rubber merchandise in Paris not long ago, the writer noticed that the salesman wore cloth gloves to protect the colored rubber goods from perspiration marks. It is not generally known in the trade that there are substances in human perspiration powerful enough chemically to fade colors wherever touched.

It is not possible to see a normal finger-print made on rubber. But if a piece of rubber, plain or colored, is impressed a few times with the bare fingers and then analyzed by a finger-print expert, the swirls of the prints will be seen.

So important has this question of fading or staining of colored goods by perspiration become that special attention is being given to it within recent times. Consequently many dealers subject the colors on rubber goods to a perspiration test as well as a light and general wearing test. The well-known lactic and citric acid tests will determine whether a color in a rubber garment is going to bleed or lose its brilliancy when brought into contact with perspiration.

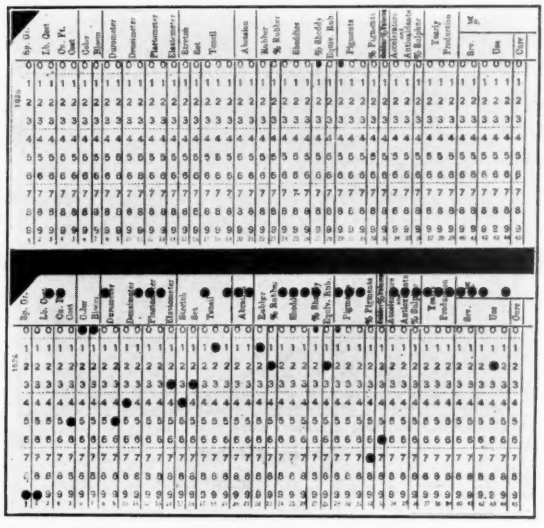
The tests fail in some cases because of the difference between new perspiration and that which has decomposed. Therefore testing is accomplished with a double solution, one of which proves whether or not the color on a rubberized fabric is fast when subjected to fresh perspiration and the other when subjected to decomposed perspiration.

The first solution is made up of 10 gr. of sodium chloride, 1 gr. of lactic acid, and 1 gr. of mono sodium ortho phosphate per liter of solution. The other solution consists of 10 gr. of sodium chloride, 4 gr. of ammonium carbonate, and 1 gr. of disodium ortho phosphate per liter of solution. These solutions are made up and used as testing mediums on the basis that perspiration is acid when it first exudes from the skin, but soon becomes alkaline through decomposition and affects colors differently.

The Application of Modern Statistical Machinery to Rubber Compounding

J. D. MORRON[1]

EVERY rubber chemist and compounder in these days is obliged to work to a very close margin in order to produce stocks at a low enough cost to meet the keen competition which exists in the rubber business. To do this, the compounder must use to the fullest extent his knowledge of materials and the technology of rubber compounding. Since speed is also a prime requisite of modern industry, the compounder, to work successfully, is obliged to keep in mind, in addition to those facts which are part of his technical knowledge, a large amount of data and assorted information which has no particular value except as a test of memory. While it is very convenient to have a marvelous memory, the average man is not so fortunate; therefore, mechanical devices which will automatically prevent human errors should be provided in connection with the compounding of rubber.



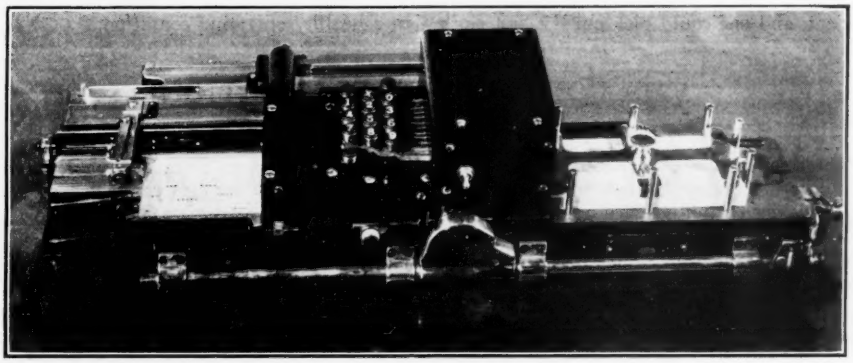
Tabulating Card—Unpunched and Punched

The writer considered this for some time and finally concluded that it should be possible to apply statistical machinery as an aid to compounding. While modern statistical machinery has been employed in business for many years to gather and sort various classes of data, to the best of the writer's knowledge, it has never been applied to the present subject. To realize more fully its application, it is first necessary to describe the conditions at any plant where a large number of recipes are used. For instance, at all times about five hundred active recipes are in our own plant. These vary greatly, each being adapted for certain specific purposes. Of course it is absolutely impossible for any individual to keep in mind all the various characteristics of each recipe.

The ordinary course of procedure, when an inquiry arises or a compounding problem is to be solved, is to think over what stocks might meet the condition. The compounder probably will think of about a half dozen stocks which approximate the type desired and may find one fairly close enough to be usable. If, however, he does not recall the proper stock, and does not locate it after searching through the recipes, he is then obliged to compound a stock to meet the conditions on hand.

It is a very conservative figure to state that about 50 per cent of the new stocks compounded are not due to the actual need of a new recipe but to the fact that no one is able to remember at the time a stock which is absolutely satisfactory for the one purpose. Even if a compound is picked out which will serve for the job at hand, it does not necessarily mean that the best or the least expensive stock has been selected for the purpose.

To overcome these conditions, the writer has devised a system of recording data by a standard statistical card which will make it possible to sort out in a few minutes the type of stock desired for any purpose whatsoever. Of course it is understood that every organized compounding department will have on hand classified data as to the various properties of stocks, but the difficulty of going over such lists when five or six factors must be considered at one time is surprisingly great and means the use of a large amount of time which can be ill spared from constructive work.



International Business Machines Corp.

Card Punching Machine

It must be remembered that no matter how constructive and valuable the work of the technical department is, still its work does add to the overhead of the plant; and anything which will decrease this overhead by promoting greater efficiency means a

[1] Director of Laboratory, United States Rubber Co., Cleveland, O. Paper read before the Akron Group, Rubber Division, A. C. S., May 12, 1930. Publication permitted by *Ind. Eng. Chem.*

decided saving to the organization. On these cards various types of data are indicated by a punched hole, and an electrically operated sorting machine sorts them in any manner desired according to the holes which have been punched in them. The tabulation card shown on the first page of this article covers the following:

Specific Gravity	Set	Rubber Per Cent Volume
Pound Cost	Tensile	Accelerators
Cubic Foot Cost	Abrasion	Antioxidants
Color	Rubber	Per Cent Sulphur
Bloom	Per Cent Rubber	Yearly Production
Durometer	Shoddies	Service
Densimeter	Per Cent Shoddies	Use
Plastometer	Equivalent Rubber	Cure
Elastometer	Pigments	
Stretch	Per Cent Pigments	

Of course these properties may be varied according to the judgment of the user of the system.

It will be noted that under each property on the card is a space for ten subdivisions of that property, each one of which is given a certain figure, as shown on the code card. For instance, take the first column, specific gravity, zero equals a stock having a gravity up to 1.10, 1 equals a stock having a gravity up to 1.2, 2 equals a stock having a gravity up to 1.3, and so on up to 9 having a gravity of 1.9 to 2.

In operation, a card is used for each stock, and a hole punched under each property over the figure which according to the code designates the characteristic of the stock concerned. Thus to record a stock having a gravity of 1.35, a hole would be punched under the specific gravity column over the figure 3. In this way for every property a hole is punched in the appropriate column. This is done by the special punching machine shown herewith.

International Business Machines Corp.

Sorting Machine

In operating the system the whole bunch of cards is put into the sorting machine, and each property which is most essential is set on the machine in turn. The cards are quickly sorted into ten classes corresponding to the ten numbers on the card. It can be readily seen that in three or four passes through the machine, all properties which are needed for an inquiry will be sorted.

For instance, an inquiry has been received calling for a tensile of 1,500 pounds, the stock to be black, non-blooming and having a densimeter of 50. In this case all that is necessary would be first to put the cards through on the color column. Another pass through would give the tensile, and a third pass would further classify the cards into those of the proper densimeter. From this point visual inspection would ordinarily be sufficient, and one could pick out the best stock which meets the requirements. In case one is working on pound cost or cubic foot cost, the cards can be sorted accordingly; immediately all the recipes which will meet a certain cost figure can very easily be obtained, and the question on hand decided.

It is very difficult to visualize at one time all the benefits which can be derived from this system. First of all, clerical work will be reduced. It is quite common in changing compounds to need to know all the stocks which contain certain classes of rubber, etc. This can be done instantly on this machine. The same thing can be applied to shoddies, pigments, and accelerators. Inquiries can be answered with one-fourth of the previous labor since the few essential properties needed to match a given stock or condition can be quickly sorted out and the proper stock found with a few minutes of work. While the direct saving in labor means considerable, its value is very little compared with the accuracy of the decision.

This machine makes it possible to select instantly not only a stock which will serve the purpose, but the best and cheapest stock available for the job. In the use of any system depending on memory, the selection of the best stock for the purpose is necessarily dependent upon the individual.

On miscellaneous compounding it is possible that ¼- to ½-cent per pound average will be saved in estimating. While this may not be true on special items where intensive effort has been used to reduce costs, it will doubtless apply to the average run of business. Once having installed such a machine in connection with technical work, a great many uses can be seen for it in connection with the gathering of data and various types of information not pertaining particularly to compounding.

In summing up, the following benefits are claimed for the application of statistical machinery to compounding:

1. A method of gathering together technical data with a minimum amount of effort eliminating all personal factors depending upon the compounder's memory.
2. An increase in the exactness of estimating.
3. A reduction in technical overhead.
4. A decided increase in profits due to the selection of the cheapest stock for the purpose desired.

Last of all there should be kept in mind that in many cases the difference between a busy and an idle factory depends upon a very small differential in cost, and the saving which can be made by this system may be great enough to obtain the competitive business which helps keep the factory in a healthy operating condition.

THE FORD RUBBER PLANTATION

The Ford Brazilian Enterprise Actively Progressing

THE rubber plantation of the Ford Industrial Co. of Brazil, located on the Tapajos River, 150 miles south of Santarem, is being developed rapidly since actual work was commenced about a year ago.

A temporary hospital, staff houses, native camps, sawmill, commissary store, dock, machine shop, garage for trucks and tractors, roads, water and electrical systems, have been provided or installed. About 2,000 acres of land have been cleared, 1,800 acres planted, and permanent work initiated as follows: power plant, 70 per cent completed; sawmill, 60 per cent completed; filtration plant, 45 per cent completed; water intake, 50 per cent completed.

Permanent construction only will now be undertaken, and plans for immediate execution include a large hospital, town sites, hotel, schoolhouses, church, floating dock, three miles of railroad, additional staff and foremen's houses, and native laborers' houses. All of this work represents an outlay of approximately $2,000,000. The necessary materials and staff are now in the field, together with more than 2,000 laborers.

A Simple Abrasion Test Machine for Rubber[1]

P. A. SIGLER and W. L. HOLT
Bureau of Standards, Washington, D. C.

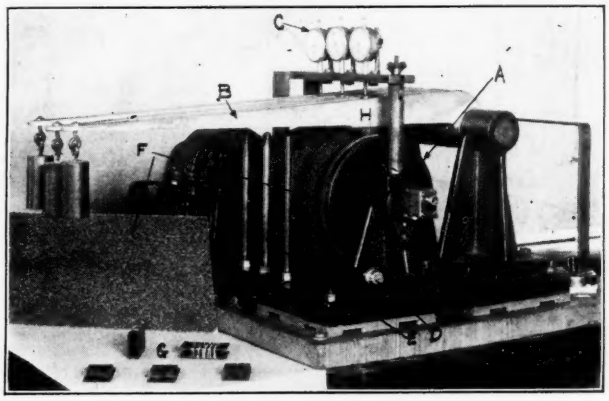


Fig. 1—Abrasion Test Machine

CONSIDERABLE time and energy have been spent in the past several years by numerous investigators to develop an abrasion test machine acceptable as a general standard for measuring resistance to abrasion. This paper describes a machine of simple type which has been used at the Bureau of Standards for several years, which has proved to be very convenient for measuring the abrasive resistance of rubber compounds. A survey of the literature on the subject of abrasion test machines together with the results of tests made at the bureau lead to the conclusion that a simple "straight abrasion" machine will give results as reliable as those obtained with more complicated machines.

In connection with any discussion of the abrasive resistance of rubber compounds, it should be borne in mind that this quantity depends upon the type of abrasion referred to. For instance, under certain conditions a "pure gum" rubber is superior to a compounded stock in its resistance to abrasion although under most conditions the reverse is true. In speaking of abrasive resistance, however, it is generally understood that compounds such as are used for tire treads have this property to a high degree, and tire tread service is used as a criterion of abrasive resistance. Even this, of course, is not entirely definite, owing to the different ways in which tires are used and the different kinds of roads they are called upon to travel; but experience has shown that certain compounds stand up best under average road conditions, which are recognized as high abrasive compounds.

Bureau of Standards "Technologic Paper No. 294," issued in 1925, shows the results of tests of tread compounds tested on the road and on various abrasion machines. One of the important conclusions which can be derived from these tests is that the simplest machine gave comparative results as good as the more elaborate types, and, with the exceptions noted, all tests were in general accord with service tests. The results of further investigations from different sources since that time serve to verify the conclusions that a simple "straight abrasion" machine is adequate in the majority of cases where abrasion tests are desired.

Machine and Method of Operation

The garnet paper machine referred to in "Technologic Paper No. 294" was redesigned for greater rigidity and compactness and made to accommodate three samples at a time in place of a single sample. This machine, which is shown in Figure 1, consists essentially of: (A) A rubber coated metal drum which is rotated at 40 r.p.m. by a reducing mechanism and an electric motor, the revolutions of the drum being indicated by a counter attached to one end of the shaft. (B) Three aluminum arms, each pivoted at one end and each having a weight suspended at the other end, such that a downward force of five pounds is exerted directly on the test piece on the under side of the arm at H. (C) Three dial gages graduated in thousandths of an inch, fastened to a bridge so that each contacts with the corresponding arm at a point directly over the test piece. This bridge is hinged at one end to allow the gages to be swung out of the way when desired as well as to allow the arms to be swung back for the placing of samples on them. (See Figure 2.) (D) A compressed air line for keeping the abrasive surface clean. (E) Arm stops. (F) An abrasive consisting preferably of No. 2½ garnet paper or cloth 6 inches wide, held on the rubber covered drum by four rubber bands. A piece of abrasive paper cut to the proper size is shown. The ends are cut at an angle of about 80° and when in place have a clearance of about $\frac{1}{16}$-inch.

The samples, which ordinarily consist of rubber compounds ¼-inch thick and 1-inch square, are cemented to small fiber disks which in turn are fastened to the weighted arms. [See Figure 1 (G).] The samples are secured to the fiber disks with glue or preferably with "Vulcalock" cement. With the latter, the sample and the disk are each given a coat of cement, which is allowed to dry. The two are then pressed together and this unit placed on a steam table with the fiber down for about a minute or until the cement softens. Next the two are held together with a clamp until cool. Samples may be tested within an hour, but it is preferable to allow twelve hours or more for the cement to set. It is entirely practical to make samples of several different pieces, to

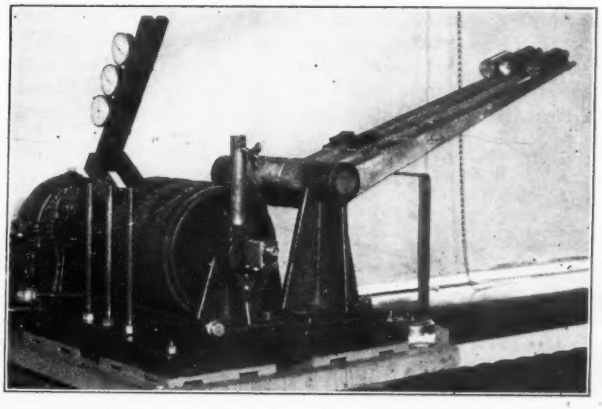


Fig. 2—Abrasion Test Machine with Arms Back for Attaching Samples

[1]Publication approved by the Director of the Bureau of Standards of the United States Department of Commerce.

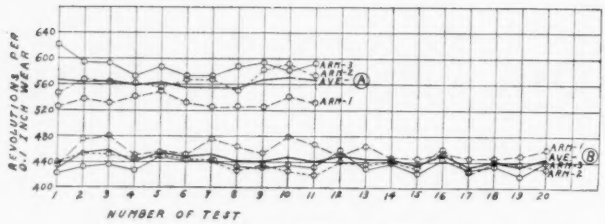


Fig. 3—Duplicability of Results

In A, eleven consecutive tests of the same compound were made on a section of abrasive cloth. In B, twenty consecutive tests of the same compound were made on a section of abrasive paper.

give a one-inch square section as shown in Figure 1 (G).

In making a test the samples are first allowed to wear until the surface conforms to the shape of the drum; the machine is then stopped, the gage bridge locked in place, and all gages and the counter set at zero. The machine is then run until about 0.1-inch has been abraded from the samples, and the machine again stopped, and the counter and gage readings recorded. Readings may be taken while the machine is running, but it is considered preferable to take them with the machine stopped and always with the drum in the same relative position. From these readings the "revolutions per 0.1-inch wear" (the usual unit) are calculated. Tests have shown that within reasonable limits the wear is directly proportional to the number of revolutions of the abrasive drum so that neither the volume abraded nor the revolutions of the abrasive drum need be definite. One-tenth of an inch of wear is ordinarily sufficient for calculating the rate of wear to the desired accuracy.

Table 1. Typical Data Sheet Showing Usual Method of Recording Results and the Relation Between Tests on the Three Arms

Sample	Arm	Rev.	Loss, Inches	Rev. Per 0.10-Inch Wear	Abrasive Index
A	1	500	.092	543	110
	2	500	.095	526	111
	3	500	.094	532	106
	Average	...	...	534	109
B	1	500	.115	435	88
	2	500	.121	413	87
	3	500	.112	446	89
	Average	...	...	431	88
Standard	1	500	.101	495	100
	2	500	.105	476	100
	3	500	.100	500	100
	Average	...	...	490	100
C	1	400	.119	336	68
	2	400	.122	328	69
	3	400	.116	345	69
	Average	...	...	336	69
D	1	400	.113	354	72
	2	400	.118	339	71
	3	400	.113	354	71
	Average	...	...	349	71

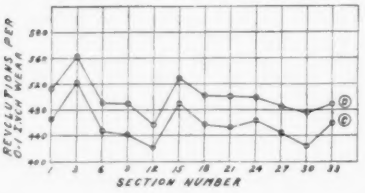


Fig. 5—Variations in Abrasive Papers

This shows the variations in results obtained on two compounds, C and D, abraded on sections cut from the same roll of No. 2½ garnet paper. Each point shows the average result from three arms.

Table 2. Test Conditions of Abrasion Machines

Machine and Maker	Load on Sample Lbs./Sq. In.	Speed of Slip Ft. Per Min.	Abrasive
New Jersey Zinc. New Jersey Zinc Co.	About 0.8*	175	Very coarse
U. S. Machine Henry L. Scott Co.	Varies probably 5 to 10	172 Intermittent	Fine No. 60 oloxite
du Pont Henry L. Scott Co.	4	47	Fine No. 2/0 Sandpaper
Akron Standard Mold Akron Standard Mold Co.	Varies. In general high	Varies. In general low	Medium
B. S. Disk Machine Bureau of Standards	Varies. In general high	Varies. In general low	Medium, coarse carborundum
B. S. Garnet Paper Machine Bureau of Standards	5	60	Coarse, No. 2½ garnet

*The average load is probably considerably higher when lifts are used.

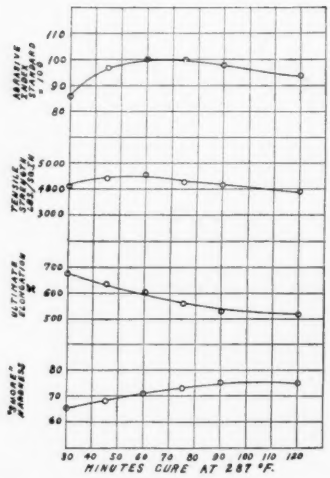


Fig 4—Data on the Standard Compound

This shows the influence of length of cure on the abrasive resistance, tensile strength, ultimate elongation, and hardness.

It will be noted that the loss in volume of a sample for any number of revolutions of the abrasive wheel is calculated directly from the gage and counter readings without the necessity of making any weighings or gravity determinations. The abrasive resistance of a sample is expressed numerically by an abrasive index, which is taken to be the number of revolutions of the abrasive drum required to abrade a unit volume of the sample divided by the number required to abrade a unit volume of a standard compound. The abrasive index of the latter is arbitrarily designated as 100. Thus, the higher the abrasive index the greater the resistance to wear. A convenient method is to test three samples, one on each arm, and compare the average result with the average of three standards, one on each arm. If one arm only is used for a test, the comparison should be made with a standard on the same arm. (See Table 1.)

In using any particular sheet of abrasive it has been found that the first two or three samples tested seem to dull it slightly, after which the sheet remains practically constant for a considerable time. The usual method is to use each piece of abrasive for surfacing several samples before using it for testing. After this treatment each piece may be used for a number of tests without appreciable dulling. (See Figure 3.) As a matter of precaution standards are usually tested for comparison after each fifth test, and the abrasive changed after 15 or 20 tests. On the basis of data which have accumulated, however, it is thought that in many cases the abrasive could be used satisfactorily for a considerably larger number of tests.

A number of consecutive tests, using different specimens of the same compound and the same section of abrasive paper (or cloth), illustrated in Figure 3, indicate that in the usual operation of the machine the abrasive index should be duplicable to within about 5 per cent. The observed variations must be attributed in part to the errors in cutting test pieces exactly one square inch in area and in measuring thickness. These errors are estimated to be within ±2 and ±1 per cent, respectively.

The time necessary to make a test, of course, depends on the quality of the stock tested. A high grade tread material requires about ten minutes for surfacing and ten minutes for testing.

This machine is adapted for testing many finished rubber products, such as tire treads, heels, and soles. Samples of various sizes or shapes may be used provided there is suf-

TABLE 4. MISCELLANEOUS COMPOUNDS. THIS TABLE SHOWS THE ABRASIVE INDICES OBTAINED ON A VARIETY OF RUBBER COMPOUNDS

Compounding Ingredients	Compounds												
	1-A	2-A	3-A	4-A	1-B	2-B	3-B	4-B	1-C	2-C	3-C	4-C	5-C
	Parts by Weight												
Rubber	100	100	80	60	100	100	100	100	100	100	100	100	100
Reclaimed rubber	...	...	33	66	...	...	...	...	...	...	...	...	...
Zinc oxide	18.2	18.2	18.2	18.2	116*	5	5	5	20	20	20	20	20
Micronex	24.4	40	37.5	35	...	34*	...	...	20	30	40	50	60
Thermatomic carbon	...	...	...	...	...	...	34*	...	...	...	...	...	...
Dixie clay	...	...	...	...	...	...	...	52*	...	...	...	...	...
Stearic acid	2	2	2	2	...	...	...	...	2	2	2	2	2
Pine tar	2	2	2	2	...	...	...	...	...	...	...	...	...
Sulphur	3.5	3.5	3.5	3.5	4	4	4	4	3.5	3.5	3.5	3.5	3.5
DOTG	1.25	1.25	1.12	1.0	...	...	...	...	1.25	1.25	1.25	1.25	1.25
DPG	...	...	...	...	1	1	1	1	...	...	...	...	...
"Shore" hardness	65	70	78	78	62	69	62	63	65	69	73	78	82
Abrasive Index Standard = 100	95	112	66	55	57	97	43	54	87	97	112	122	129

Note—The A compounds are similar to those referred to in A.S.T.M. report in INDIA RUBBER WORLD, Nov., 1929, p. 66.
* Twenty volumes based on the rubber.

ficient thickness to obtain a rate of wear. Also different grades of abrasive can easily be used.

Test Conditions

Perhaps one of the most surprising observations in connection with a study of the abrasive resistance of rubber compounds on laboratory machines is how little the relative abrasive resistance of a series of compounds is influenced by the speed of cutting, the load on the sample, or the type of abrasive. Table 2 shows the wide variation in these factors in the different types of machines now in use, but in spite of this the results reported in the literature are in general accord with known service results. The fact that there is a general agreement in the results of tests made on different machines shows the permissible latitude in establishing test conditions.

As a result of experiments with this and other machines and from a general observation of abrasion test results, standard conditions for testing were established as follows:

SPEED. The standard speed used with the machine is 40 revolutions of the abrasive drum per minute (equivalent to approximately 60 feet per minute). Experience has shown that the speed can be varied between quite wide limits without seriously influencing relative results, but that, in general, a "slow" speed is the most desirable. The maximum speed is limited mainly to avoid excessive heating of the sample. With this particular machine a high speed may cause a vibration of the samples. Measurements of the temperature reached by tread stocks during a test on this machine at the standard speed show a rise of about 50° F. above room temperature.

LOAD. The standard load used is 5 pounds on a sample 1 inch square. This load is more or less arbitrary. It is a convenient load which fits in well with the general design of the machine. Tests have shown that from 2½ to 8 pounds per square inch can be used satisfactorily with similar results, but that, in general, "high" loads are desirable.

ABRASIVE. A series of tests described in "Technologic Paper No. 294," showed that when using garnet as an abrasive, grit No. 2½ was faster cutting than either a finer or a coarser grit, but that aside from this feature a wide range might be used satisfactorily. The 2½ grit was adopted as standard on account of its speed of cutting and also, being comparatively coarse, it shows less tendency to clog than finer grits.

No attempts have been made to control humidity and temperature although uniform conditions are desirable. It is obvious that the temperature and moisture content of the specimen near the abraded surface are the important considerations rather than atmospheric conditions in the testing room. Any attempt to control or measure these conditions in the specimen would add considerable and perhaps unwarranted complications to the test. The use of the reference standard obviates, at least to a large extent, the necessity for the control of these variables.

Abrasion Standard

Developments in abrasion testing have not reached a point where abrasive resistance can be expressed adequately in absolute values, and it is therefore advantageous to express this property in terms of the abrasive resistance of a standard compound. (See Table 3.)

TABLE 3. COMPOSITION OF THE STANDARD COMPOUND

Ingredient	Parts by Weight
Rubber	100.00
Sulphur	3.5
Zinc oxide	20.0
Micronex	30.0
DOTG	1.25
Stearic acid, C. P.	2.00
Age Rite	1.00

This is pressed-cured, 60 minutes at 287° F., in sheets ¼-inch thick.

Experience has shown that this compound is quite easily reproduced and is not particularly sensitive to cure. It represents a good grade of tread stock with as few ingredients as consistent with its intended use. The antioxidant was added after it was determined by test that the abrasive resistance dropped more rapidly with age than is desirable. Data on this compound are given in Figure 4.

TABLE 5. COMMERCIAL TIRE TREADS. THIS SHOWS ABRASIVE INDICES OBTAINED ON 72 DIFFERENT TIRE TREADS REPRESENTING 23 COMMERCIAL BRANDS

Type and Brand	Total No. Tires Tested	Abrasive Indices Obtained on Different Tires Standard = 100 Approximate Age of Tires		
		1-6 Mos.	7-12 Mos.	13-24 Mos.
1. Pneumatic				
A	12	105, 107, 110, 128, 122, 158, 154, 156, 169	101, 162	79
B	3	117, 55*, 40*	...	...
C	7	82, 102, 100, 93, 96	99	76
D	6	61, 77, 59, 70, 104	...	67
E	4	83, 81, 86, 109	...	...
F	4	70, 104	68	63
G	3	64, 70	69	...
H	2	119	...	79
I	2	120	139	...
J	2	182	...	74
K	2	75	74	...
L	1	116	...	...
M	1	83	...	...
N	1	96	...	...
O	4	.....	97	90, 95, 97
P	2	.....	98, 105	...
Q	2	.....	...	87, 84
R	3	.....	66	85, 59
S	1	.....	...	82
T	2	.....	124	76
U	1	.....	80	...
2. Solid				
C	1	79	...	...
E	1	.....	...	62
I	2	.....	...	59, 54
T	1	.....	...	69
V	1	.....	57	...
W	1	.....	...	57

*Second grade tires.

The abrasive paper or cloth used with this machine is obtained commercially in rolls 6 inches wide and 150 feet long. It was hoped that the cutting qualities throughout one roll of the abrasive would be sufficiently uniform to permit the use of one roll as a standard abrasive for the express purpose of checking the reproducibility and uniformity of the standard. compound. However, preliminary tests indicated that such was not the case. To determine how much variation would be found within a roll of abrasive paper, one roll (150 feet) was cut into lengths, and every third length throughout the roll tested for cutting properties. The results showed variations of about plus or minus 10 per cent in different parts of the roll (see Figure 5) and also variations across the width.

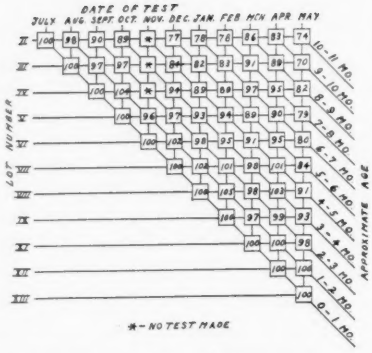


Fig. 6—Periodic Comparison of Standard Compounds

It is evident from Figure 5 that the different results obtained on the various sections of abrasive paper are due principally to differences in the paper itself and not to testing errors, as the cutting qualities of the various sections show up similarly on each of the two compounds tested. A further variation in cutting qualities of abrasives was brought out by consecutive tests of the same compound using the same sections of abrasive paper but reversing the direction of travel. Differences in cutting qualities of as much as 8 per cent were found to be not unusual. These variations seem to be what may be expected in commercial abrasive paper as similar variations were found in materials from other sources.

An attempt is being made to obtain an abrasive surface which will remain constant for a long period of time by installing a track of flexible abrasive cloth 500 feet long to be used in conjunction with the abrasion machine. This track is arranged to pass around the drum of the abrasion machine in winding and unwinding between reels and is of sufficient length to abrade about 0.1-inch from the standard compound in one trip through the machine. It has been shown above that the cutting qualities of the abrasive material become approximately constant after moderate usage, so that the track should serve, for a long time at least, as a means of checking the reproducibility and uniformity of the standard compound.

The maintenance of the standard compound must depend primarily on the careful selection of the ingredients used and on the uniformity of the compounding procedure until such time as it is possible to define it in terms of its physical properties. It is the practice at the bureau to make up sheets of the standard compound monthly, sufficient for 200 tests. Each lot is compared to the previous lot and is considered to have an abrasive index of 100, provided the revolutions per 0.1-inch wear agree within 5 per cent. Figure 6 is a compilation of results obtained by comparing monthly all preceding lots with each new lot as a standard. Each value represents the average of from 3 to 12 tests. Due to the apparent decrease in abrasive resistance with age, indicated by these data, standards are not used when more than three months old. Lots IX to XIII contain an antioxidant, and it is hoped that this will have the effect of decreasing the rate of change of abrasive resistance with age.

Miscellaneous Test Results

In order to give a general picture of the results which may be expected with this machine on different rubber compounds, several types were tested and the results are shown in Table 4.

Compounds 1-A, 2-A, and 2-B are high carbon tread type compounds, all of which show abrasive indices in the neighborhood of 100. Compounds 3-A and 4-A show the influence of reclaimed rubber substituted for new rubber. The four B compounds contain respectively equal volumes of different ingredients, and the superiority of reenforcing carbon shows up in the manner expected. The five C compounds contain different amounts of carbon black, and the results are in general agreement with the behavior of such compounds in tire treads. It will be noted that the abrasive resistance of the C compounds increases with increase in hardness. This does not occur in tests of all compounds.

Tests pieces were cut from the treads of 72 standard tires, and abrasion tests made. These are listed in Table 5 grouped by brand. This table serves to show the range in abrasive resistance which may be expected from commercial tire treads as well as the adaptability of this machine for testing finished articles.

In general the machine described in this paper should prove valuable as a means of determining the relative abrasive resistance of rubber compounds under specified conditions of wear. By maintaining a permanent standard for comparison, abrasion determinations as described might be adopted for use in specifications.

Bibliography

Following is a list of recent publications relating to the subject of abrasive resistance of rubber.

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"Measurement of Abrasive Resistance." Williams. *Ibid.*, 19, 674, 1927.

"Analysis of a Typical Angle Abrasion Machine." Vogt. *Ibid.*, 20, 303, 1928.

"Abrasion Tests of Stock Containing Carbon Black." Plummer and Beaver. INDIA RUBBER WORLD, 79, 73, 1928.

"Wearing Qualities of Tire Treads as Influenced by Reclaimed Rubber." Bureau of Standards "Technologic Paper No. 294."

"An Explanation of Some of the Difficulties of Abrasion Testing of Rubber." Depew. *Proc. Am. Soc. Testing Materials*, 28, Part II, 1928.

"Predicting Abrasive Life of Rubber." Report of Committee D-11, A. S. T. M. INDIA RUBBER WORLD, 81, 66, 1929.

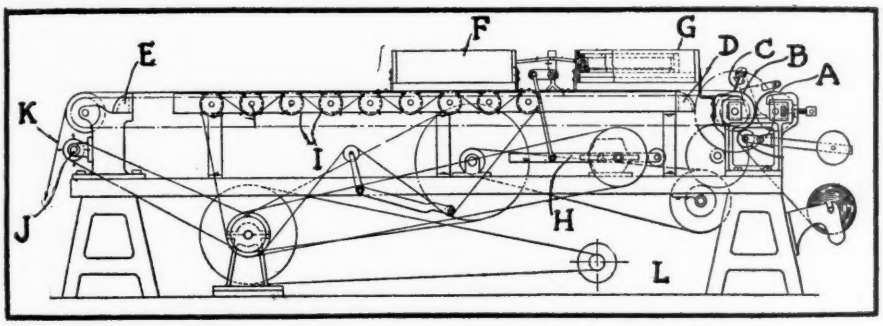
"The Mechanism of Reenforcement of Rubber Pigments." Depew. *Rubber Age* (*N. Y.*), 24, 378, 1929.

Rubber Consumption and Automobile Production

Crude rubber consumption during the first six months of this year was the highest on record, except in the corresponding months of 1929. June consumption was 20.3 per cent less than in June a year ago, and 8.5 per cent less than in June, 1928, but 5.8 per cent above the average June consumption for the past eight years. Production of pneumatic casings for the first five months of 1930 exceeded shipments by less than 7 per cent as compared with 12 per cent for the same period a year ago, 11 per cent in 1928, 9 per cent in 1927, and 20 per cent in 1926.

June production of automobiles is estimated at 343,000, 22 per cent below May and 39 per cent under June last year. The output in the first half amounted to 2,322,211 as against 3,413,804 in the record year of 1929 and 2,326,509 in 1928.

Imitation Suede and Buckskin



Machine for Making Imitation Suede Leather and Buckskin

A New Product Developed by Rubber Latex

The following is a formula for an adhesive mixing with a concentrated latex base:

Latex (revertex)	10 kg.
Zinc oxide	600 gr.
Vulcacite P.	15 gr.
Sulphur	150 gr.
Water	750 gr.

FABRICS known as "Tressor" made to imitate suede leather and buckskin, are new in the rubber industry. They were originated to meet a style demand, and their use is chiefly for decorative and trimming effects on dresses and shoes, also for ladies' light dress belts and novelty articles in variety.

While paper has been utilized as a basis for these imitations of leather, cotton sheeting of light and inexpensive quality is preferable because of the pliability and the considerable strength it gives to the finished product.

The course of manufacture is as follows: The fabric is first dyed with a cheap dye of suitable color; then, if of open weave, its mesh is filled with flexible dressing by coating it on a friction calender to close completely the textile construction. If artificial leather is used as a basis, no special preparation is needed before application of the adhesive coating for attachment of the fiber dust as surfacing.

Suede leather surface is imitated by wool flocks; while buckskin is imitated by a coating of fine leather or cork powder. These dusting materials are reduced to exceeding fineness by special cutting machinery. All coarse fibers are removed by careful bolting through a series of sieves of progressive fineness sc that the appearance of natural skin may not be marred by the presence of coarse material.

The nature of the adhesive for attaching the fibers or the powder deposited on the fabric greatly influences the flexibility of the finished product. Many adhesive materials have been tried with indifferent success, but the best is said to be rubber latex, especially the concentrated form.

This latex contains only about 25 per cent of water, and the flexibility which this coating possesses after drying is remarkable. Also its adhesive power and its resistance to water after vulcanization are not equaled by ordinary adhesives. When dry, concentrated latex is perfectly odorless, and during the spreading process it does not penetrate the fabric because of its pasty consistency. The fabric, consequently, requires no special treatment. Finally, this form of latex is very economical to use as no solvent is required with it. Nor is it necessary to apply a dressing to the fabric before spreading. This is very important because of the incompatibility of the texture of a dressing and the imitation cloth.

Furthermore, by using concentrated latex, manufacturing imitation buckskin offers no difficulty; this makes it possible to obtain really cheap fabrics. A simple paper of good mechanical resistance or a dyed muslin of not too open mesh serves as the base. Where muslin is used, it is enough to calender it to obtain a surface on which the coating of latex is easily spread.

First a paste is prepared containing the zinc oxide, sulphur, vulcacite P.[1], and water. The paste is ground together and mixed with the latex. This mixture is again passed through the grinder until a mass of the required consistency is obtained. In preparing this adhesive it is not necessary to use a larger quantity of water; otherwise the fibers or dust deposited on the cloth would not only be overgummed but would be coated with the gum, and the desired effect would be lost.

The use of zinc oxide, sulphur, and vulcacite P. in preparing the adhesive mixture, facilitates vulcanizing the layer of rubber at a relatively low temperature and in the shortest time possible. The revertex is applied to the fabric base by means of modified rubberizing machines or spreaders. These must be regulated perfectly so that only an exceedingly thin coating of the revertex will be deposited on the fabric. As an example, they are also modified and specially equipped with dusting sieves and rotary brushes after the arrangement shown in the illustration, which represents a patented mechanism[2] for flocking fabrics in long lengths by applying to them an adhesive and then dusting or sifting upon them powdered cotton, wool, etc., in various colors.

The operation of the mechanism is as follows: The adhesive is applied to the fabric as it passes between the rollers *A* and *B*, which, in conjunction with side plates, form a trough to contain the adhesive during its application. The roller *A* is screw-adjustable, and the fabric is tensioned and pressed against the roller *B* by a counter-weighted roller below. A scraper *C* spreads the adhesive and returns the excess to the trough. The fabric then travels over a flexible table of textile material or leather fixed at its ends to blocks *D* and *E*. Above the table are powder applying devices *F* and *G*, each comprising a compartmented powder-box with perforated bottom slidably mounted and actuated simultaneously by an oscillating mechanism *H*.

The dust-boxes *F* and *G* stop with a jerk at the end of each stroke. A number of beaters *I* on rotary shafts act against the under side of the flexible table, and an additional beater *J* acts to remove the loose dust and fibers on the fabric *K* as it leaves the machine. The various rollers, beaters, etc., are actuated by belt drives from a motor *L*.

The dried imitation tissue thus produced may be brushed a second time to remove all the loose fibers, but it is preferable to run the fabric through a calender to exert a slight pressure on the dust and the fibers which adhere imperfectly. A very light brushing next follows to even up the surface. Thus the appearance of spots in the fabric that are too bare of fiber or dust is avoided. The imitation cloths as well as the imitation buckskins produced by employing latex are distinguished by flexibility and strength, and they far surpass products made with a base of gelatine, starch, or varnish.

[1] Penta-methyl dithiocarbamate of zinc.
[2] British Patent No. 319,064, Nov. 6, 1929.

COMPRESSETOMETER

A Static Compression Testing Instrument

THE following description of an instrument known as a compressetometer is quoted from a recently published paper.[1] This instrument is designed as a static compression testing device inasmuch as permanent set and fatigue tests are performed under steady loads. It is extremely useful in making deflection, hysteresis and set tests, and is suitable for tests at loads up to 228 kg. (500 pounds). The capacity may be increased by substituting heavier springs. This instrument makes possible many special tests, particularly tests at high and low temperatures.

The compressetometer, which is mounted in an electric oven, produces compressive loads on test pieces by three tension springs, placed outside the oven to avoid heat effects as much as possible. By turning the hand wheel, *A*, in a clockwise direction, the springs are made to pull a plunger, *B*, down onto a sample resting on the bottom plate, *D*. Loads are measured in 5-pound units on the scale, *L*. The gage *G*, measures deflections in thousandths of an inch. The spindle, *S*, can be adjusted to various heights to get the correct zero point on the deflection gage for various thicknesses of test pieces.

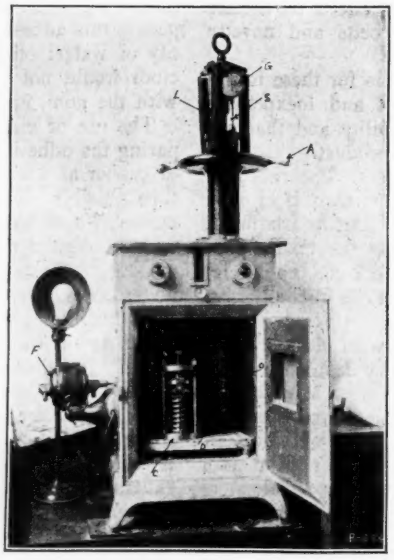
A high degree of accuracy is possible, especially when testing small round disks cut from slabs, merely by lowering the plunger and noting the position at which it just touches the test piece. More positive accuracy is obtained, however, by first running the plunger down as far as it will go, setting the deflection gage to that reading corresponding to the thickness of the sample to be tested, and then raising the plunger and inserting the sample. The latter method is used in all research and special or comparison tests.

A fan, *F*, provides circulation of air. A thermometer is so inserted through the orifice, *O*, that readings can be taken through the glass in the door. As a special precaution in some cases, particularly in getting heat tests started, the thermometer is inserted from the front so that its bulb rests on the plate, *D*.

To avoid errors due to temperature effects when standard permanent-set tests are made, it is necessary to insert the test piece between metal plates (at room temperature) with surfaces similar to those in the permanent-set equipment used. These are then placed in the compressetometer, which is already at the test temperature, and the required load is imposed on the test piece.

In performing permanent-set tests at constant loads, the test piece is put into the compressetometer under the proper temperature conditions and compressed to the required load. There is an immediate fatigue effect, as shown by a change in the distortion during the first few minutes after the maximum load is reached. The rate of this change decreases rapidly, and this means a change in load. Consequently, for the first few minutes, and much less frequently for the next 3 or 4 hours, or even during most of the test, the hand wheel is so regulated that the load is kept constant. The drop in load over a 24-hour period due to fatigue of the samples is very small, particularly when the gage is approximately 0.635 cm. (0.250-inch).

If tests are to be run at constant distortion, the hand wheel must be run back to much lower loads than the initial maximum. Consequently, frequent adjustments are necessary, particularly at first. The fatigue effect may result in a 50 per cent drop in the load in these distortion tests.



Firestone Compressetometer

[1] "The Testing of Automotive Rubber Parts Assembled under Compression, Part I." By Franz D. Abbott. Firestone Tire & Rubber Co., Akron, O. Presented before the Division of Rubber Chemistry, A. C. S., Columbus, O., Apr. 29 to May 3, 1929. *Ind. Eng. Chem.* (Analytical Ed.), Apr. 15, 1930, pp. 145-59.

Rubber Reducing Corsets Return

Development of a New Corset Material of Silk, Rubber, and Stockinette

SO-CALLED "foundation" garments for women's wear embodying the rubber elastic quality of the reducing corsets popular in 1924[1] are again in vogue. The current types of these garments are provided with an inner surface of absorbent cotton stockinette and plied with silk or rayon net and a layer of thin rubber sheet between them. Three combinations of these fabrics with rubber are being used: silk to cotton, cotton to cotton, and rayon to cotton.

In the construction of the garments the cotton surface of these combinations is used for the lining or inner surface because of its more absorbent quality. These fabric combinations are thus superior in this respect to the combinations used in the rubber reducing garments of 1924. At that time the stocks were: pure vulcanized sheet, mercerized cotton net rubberized on one side, and silk stockinette doubled on a central ply of rubber. Thousands of these corsets were sold.

Now, as formerly, the stockinettes are of extremely fine glove quality, circular knit of very pale pink or flesh color. They are virtually transparent before coating. Therefore in order that the beauty of the goods may not be impaired, the rubberizing stock is made of the finest quality latex crepe tinted to match the color of the fabric. In fact the rubber composition represents the latest development in rapid curing pure gum, dry heat stock. The manufacturing operations are all fundamentally simple, but the delicacy and the thinness of the knit fabrics make imperative the exercise of great skill in calendering, doubling, and curing the goods.

The vulcanized material is received and fashioned into garments of various models. They launder easily and perfectly and are said to effect satisfactorily reduction of the figure.

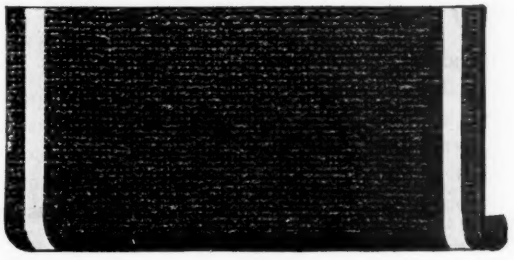
[1] India Rubber World, Aug. 1, 1924, pp. 713-14; Dec. 1, 1924, pp. 149-51.

FASHIONS FOR FLOORS

«Willisite» Rugs and Stair Treads of Rubber and Animal Hair

JUST fancy! A rug of goat hair and rubber! Yet the result is an attractive, serviceable, and profitable floor covering for all concerned.

The rubber rug nowadays is fast assuming quite an important role in the plans of ultra-modern interior decoration. And this latest creation in floor covering bids fair to outdo many of its rivals. An analysis of its possibilities will reveal the reasons for its increasing popularity.



Stair Tread

These products, such as stair treads, throw rugs, runners, and landing rugs, may be used in a wide variety of places: in the office or at home, even on the porch, in automobiles or on boats, on diving boards, in hotels and in public buildings, indeed any place at all where wearing quality is a prime requisite.

Service Advantages

Many advantages are claimed for this product, which has the look, the warmth, and the velvety feel of carpet. Flat on the floor will it lie, whereas other coverings often curl, crack, or break. It never loses its original shape. The rubber back, in addition, prevents such slipping as occurs with carpet or linoleum on polished floors. "Willisite," moreover, is as sanitary and as easy to clean as linoleum; soap and water will do the trick. This rug does not, however, give off any slippery feel, an item of paramount consideration with makers of boats. Unlike ordinary carpet which absorbs and retains moisture, this new material throws off water. Since it is not affected by the weather, it may even be used outdoors, as on porches or ship decks. Nor will it fray at the edges. This type of rug, furthermore, does not serve as moth fodder. It is said to have superior wearing qualities: it will outwear any other floor covering.

Attractive Designs and Colors

Combined with its serviceability is the appeal of its attractive appearance. This new floor covering comes in a variety of bright, attractive, and lustrous colors including French gray, green, light green, Irish heather, Scotch heather, and blue overtone. Stair treads and landing rugs can be matched in any of these colors, with a wide variety of stripes. This wide range of color permits the housewife or the interior decorator to give full sway to her artistic temperament in color blending. For these shades all nicely harmonize with many color schemes now in use, and the colors and designs are guaranteed fast and will not discolor or fade.

Variety of Product

"Willisite" is made up in stair treads, throw rugs, and landing mats and also is furnished in rolls in runner form measuring 27, 36, and 42 inches wide. Stair treads are made 9 inches wide by 18, 24, or 36-inch lengths. Special widths can be made in stair treads of practically any length. Landing rugs come in 18 by 30, 24 by 24, 30 by 30, and 30 by 45 inches. The oval rug is offered in two sizes: 21 by 44 and 27 by 54 inches, and the rectangular model is available in 21 by 40 and 27 by 54 inches. Other sizes and styles are soon to follow. Eventually regular room rugs will be made 6 by 9 feet, 9 by 12 feet, etc.

The trade's acceptance of this new product has been far beyond the fondest expectation of the manufacturer. Especially has this been true in the runner lengths, which offer an ideal floor covering for halls, corridors, entrances, and similar points.

Method of Manufacture

A word or two about the manufacture of these rugs may not be amiss. The product is named after its inventor, Glenn H. Willis, who also holds the basic patents on the use of animal hair and rubber.

This hair is received in bulk form at the factory; it is then put through a process of cleansing, combing, and carding that separates it and fluffs the hair well before it is sent to the mixer where it is mixed thoroughly with a high grade rubber compound, which acts as a binder for the fibers or units of hair.

The Trump Brothers Rubber Co., Akron, O., has erected at its plant a huge blower, and after the hair receives the carding and combing process, this blower pulls and fluffs the hair in order to put it in proper condition for subsequent operations.

The whole is cured in long lengths in specially constructed vulcanizing presses, and it is then cut to the desired size and shape. After being cured, the surface is buffed at tremendous speed to separate the hair from the rubber compound and to bring up the nap, which is quite flat when it comes off the press. These buffers rotate at the rate of 3,600 r.p.m., using a wire brush for this work. This method of buffing, incidentally, likewise proves the ability of the rug to endure much severe wear.

All of the patterns and designs are what would be termed "inlaid." The patterns of various colors are made up of a hair that has been dyed to the desired color, then mixed on the mixing mills with a rubber of the same color.

This material next is rolled out to the proper thickness, and by the use of dies and templates it is cut to the proper size and dimension. After this, by the use of jigs and templates these patterns are placed upon the rug and forced right down into the very body of the rugs themselves. Thus the term "inlaid." This process assures a pattern that is lasting and will not wash nor wear out as in the case of the cheap stenciled or painted rugs.

This very brief resumé and the illustrations serve to give some inkling of the advantages of this new floor covering. But, of course, the rug must be seen and used to realize and appreciate fully its desirable qualities.

Oval and Rectangular Throw Rugs of Animal Hair and Rubber

EDITORIALS

Pessimists Overstay Their Time

IT IS idle to say, as some contend, that the country has had only a psychological setback and that our commercial ills have been more apparent than real. We know only too well that it has suffered a very substantial setback. Business had been, as it were, on a spree; over-production, excess credit, crazy speculation, all played a part in the sudden let-down; and it has been taking many months to sober up and pay back what was borrowed so recklessly from the future.

However, sanity is largely restored and the squaring of accounts is making excellent progress. Wall Street wiseacres may affect to ignore the business revival, but the trend is nevertheless in the right direction. Most of the 122,000,000 Americans do not dabble in stocks. They have immense requirements that must be supplied in increasing measure; they are coming rapidly into the marts for new goods, as the mounting sales of the retail stores so convincingly attest; and the dealer who lets his shelves get too bare and the producer who lets his manufactured inventory get too low may get a rude jolt when the buying wave strikes its stride.

* * *

Superfluous Advice

THE suggestion has been made that rubber and other manufacturers can utilize a new discovery announced from Colgate University for ridding their shops and their products of disagreeable smells. On the principle of like cures like, the substance causing the repugnant odor is treated with a chemical perhaps equally offensive to the nose, the interaction either nullifying the malodor or making it quite aromatic.

When the redolence of rubber shops vied with that of tanneries, such advice might have been pertinent. Now it is impertinent. In these days rubber goods are so non-odorous that they need to make no smell appeal; the factories are so clean that choice neighborhoods welcome them, and so effectively are many of them operated that even the worst fumes are recovered and turned to account, even outdoing the pork-packing plants where everything is said to be saved but the animals' squeals.

* * *

Inner Tube Ratio Dropping

AS a man is said to be as old as his arteries, so the efficiency of a tire is related intimately to the state of its inner tube. Through overexertion tubes and arteries lose their elasticity and soon their usefulness. But while no substitute can be made for the natural tubes, "inners" can be frequently replaced. However, the need of replacing inner tubes is steadily growing less. Not long ago 120 tubes were made to 100 casings, but now the ratio is about 105 to 100. Soon, it is believed, it will scarcely be 90 to 100. Tube buyers, like tire buyers, are now getting more for their money largely because manufacturers are stressing quality and service; they are using choicer materials, better antioxidants and accelerators, and, not the least, they are making tubes by the full-molded, instead of the rolled, straight-mandrel process.

* * *

Might Last Too Long

ALTHOUGH the ratio of carbon black in rubber compounding is now well over the 50 per cent mark, still some chemists hope to more than double that proportion by producing "smoke within the rubber." This is what they regard as the ideal method of combination, but they admit that it is and may long remain in a nebulous state. Nevertheless, they contend, they can do nearly as much in another way by first dispersing the "smoke powder" in water with the aid of protective colloids and then introducing the sooty fluid into latex. It is held that by such incorporation not only can a masticating operation be dispensed with, but that products can be made much cheaper and their abrasion-resistance and other mechanical properties strikingly enhanced.

However, such an eminent rubber technician as Dr. T. F. Twiss does not expect any startling developments soon along that line as it is not easy to disperse large proportions of carbon black in ordinary latex permanently. He is confident, however, that "if dispersion could be maintained long enough to enable uniform mixing, the precipitate subsequently formed could be so homogeneous, with carbon black particles adjacent to latex globules, that very short mixing would suffice to get the whole of the carbon black uniformly dispersed in the rubber."

Rubber manufacturers appreciate research, but, having made products that outwear leather and even steel and being anxious to make some replacements, they can hardly grow very enthusiastic over a process that promises so much reenforcement that their goods might never wear out.

* * *

AMERICAN RUBBER MANUFACTURERS, WHO ESTIMATED that Restriction made them pay over a hundred millions more for plantation rubber than they ordinarily would have paid, may find comfort in the claim of some leading planters that their industry has lost about a billion dollars since the Stevenson Restriction Act was repealed two years ago "in deference to the Americans' objection to our control of rubber." So complaisant do they consider the British home government that they believe it would let the Americans have the West Indies for the asking.

What the Rubber Chemists Are Doing

Studies in the Vulcanization of Rubber[1]

C. R. Boggs and John T. Blake[2]

IN THIS series of four related papers the authors report their scientific investigations on the processes of vulcanization. Their work ranks high in scientific value and technical importance. The results of these studies culminate in the advancement by the authors of a new chemical theory of vulcanization. Three of these studies by J. T. Blake are outlined in the following paragraphs:

1. **Thermochemistry of Vulcanization of Rubber.** When a chemical reaction takes place, it is usually accompanied by an absorption or evolution of heat. The amount of the heat interchange is not a direct measure of the chemical affinity involved in the reaction, nor is it a measure of the free energy of the reaction. The heat of reaction, however, is a measure of the total change in internal energy and is of importance, therefore, in calculating the effect of temperature on a reaction and in elucidating the mechanism of it.

Summary. The heat of vulcanization of rubber by sulphur has been carefully determined over the complete range of combination. The formation of hard rubber is a strongly exothermic reaction, while the formation of soft vulcanized rubber is apparently without heat interchange, even in the presence of an accelerator. The vulcanization of rubber with *m*-dinitrobenzene and selenium is also without heat interchange, and only soft vulcanized rubber is formed.

2. **Vulcanization of Rubber with Nitro Compounds.** Several years ago Ostromislensky showed that a number of organic materials possess the ability to vulcanize rubber. The vulcanization does not develop quite such good physical properties in the rubber as sulphur does, but there is no question that it does take place. Trinitrobenzene, *m*-dinitrobenzene, and benzoyl peroxide were shown to be the most satisfactory of the vulcanizing agents.

We have never been able to produce a material resembling ebonite by using the above materials as vulcanizing agents. This suggests that the reagents are capable of undergoing only the soft-rubber reaction. They fall, therefore, in the same class with selenium. This reaction offers a method of studying the formation of soft rubber without the complicating effect of the hard-rubber reaction. The vulcanization of selenium has been shown to be a chemical reaction and to follow the mass-action laws. Vulcanization of rubber with nitro compounds should follow the same course and throw more light on the mechanism of vulcanization.

Summary. The Kjeldahl method for nitrogen analysis can be adapted to the determination of combined nitrogen in rubber vulcanized with nitro compounds. The combination of nitro compounds with rubber has been followed in several cases. Strong evidence is given that the vulcanization is a chemical reaction.

The density of rubber has been shown to change during vulcanization with dinitrobenzene. The change approximates the progress of the combination of the vulcanizing agent with rubber.

The vulcanization of rubber with dinitrobenzene and trinitrobenzene is monomolecular. A theory of the mechanism of the vulcanization is advanced.

The value of the stoichiometric method in estimating the molecular weight of rubber is discussed. Values of this constant are suggested by the data.

Nitro compounds appear to be incapable of producing hard rubber. The amount of combined reagent is only a small fraction of that required for ebonite formation.

3. **Kinetics of Vulcanization of Rubber with Sulphur and Selenium.** Synopsis. A procedure for the determination of combined selenium in rubber has been evolved. The rate of combination of selenium and rubber has been ascertained under certain conditions and shown to follow a first-order equation.

A minimum value for the molecular weight of rubber has been estimated.

The formation of hard rubber under chosen experimental conditions has been put on a mathematical basis and has been shown to follow a second-order reaction.

The soft- and hard-rubber reactions have been shown qualitatively to be successive reactions, and the function of accelerators has been discussed.

The theory explains the anomalous results obtained by previous investigators.

Conclusion. These preliminary studies on the kinetics of vulcanization of rubber with sulphur and selenium give, it is believed, an insight into a much discussed but little understood subject. The work opens a new branch of rubber research, and it is hoped that this and future work will throw much light on the mechanism of vulcanization. The concept of two separate reactions occurring in sulphur vulcanization seems substantiated, and the evidence of their occurring consecutively suggests a mechanism of vulcanization that allows a rational interpretation of the apparently conflicting data in the literature. It is hoped that further studies will completely elucidate the mathematics of vulcanization reactions and allow the interpretation of all possible combinations of vulcanizing agents and accelerators.

4. **A Theory of Vulcanization of Rubber.** Readers are referred to the original paper for the able and illuminating exposition of the authors' theory of vulcanization, concerning which they say:

The theory here presented has been evolved in the belief that it agrees with many of the undisputed facts of vulcanization which were previously unexplained. No well-authenticated data have been found to be in conflict with it. A theory worthy of the name should evoke fresh ideas not implied by previous theories. The present one has led to the prediction of many such facts and they in turn strongly support the new theory.

The new theory presented here was first outlined[3] in connection with a study of selenium vulcanization and amplified in the discussion of another paper[4]. The theory may be summarized in the following:

(1) Vulcanization of rubber is a chemical reaction in which the vulcanizing agent adds to all or a portion of the double bonds of the rubber molecule.

(2) There are two possible stable addition products of vulcanizing agents and rubber—soft vulcanized rubber and ebonite.

(3) There are two types of chemical unsaturation in the rubber molecule corresponding, respectively, to these two products. After the soft-rubber bonds are satisfied, the addition of sulphur to a portion of the double bonds concerned in hard-rubber formation gives rise to a third and unstable type of material, which we call intermediate or partially formed hard rubber.

(4) Certain vulcanizing agents undergo only the soft-rubber reaction, since they are incapable of adding to all the double bonds.

(5) The two chemical reactions occur successively in any one molecule during vulcanization with sulphur.

(6) Accelerators speed up the soft-rubber reaction but have practically no effect on the hard-rubber reaction. The maximum physical properties of soft vulcanized rubber are obtained when the soft-rubber formation is completed with the production of a minimum amount of intermediate hard rubber.

(7) There is a definite relationship between the physical properties and the combined sulphur of vulcanized rubber only when intermediate hard rubber is not formed.

(8) The amount of combined sulphur needed to produce pure soft rubber is approximately 0.5 per cent, which corresponds to $(C_5H_8)_{200}S_2$.

(9) The normal deterioration of soft rubber with age is due to the oxidation of the rubber molecule when the hard-rubber reaction has been started but not completed.

[1] *Ind. Eng. Chem.*, July, 1930, pp. 737-55. Presented before the Division of Rubber Chemistry at the 79th Meeting of the A. C. S., Atlanta, Ga., Apr. 7 to 11, 1930.

[2] Simplex Wire & Cable Co., Boston, Mass.

[3] Boggs and Follansbee, *Trans. Inst. Rubber Ind.*, 2, p. 273 (1926).

[4] Blake, *Rubber Age* (*N. Y.*), 24, p. 494 (1929).

(10) During hard-rubber formation the sulphur adds progressively from one end of the molecule to the other. This gives rise to dipoles which have a maximum effect when the reaction is about half completed. This offers an adequate explanation of the electrical properties.

(11) The reclaiming of rubber results in the decomposition of the vulcanized rubber molecule into two portions, one containing practically all the combined sulphur and being insoluble in chloroform, and the other sulphur-free and soluble.

Summary. The new theory, it is believed, explains completely the various phenomena connected with the vulcanization of rubber. It is entirely a chemical theory based on the existence of two separate and distinct rubber compounds, soft vulcanized rubber and ebonite. The theory explains satisfactorily the aging of rubber, the variation in combined sulphur at optimum cure caused by acceleration, the kinetics of vulcanization, the characteristics of various vulcanizing agents, the thermochemistry of vulcanization, the electrical properties of rubber, the reclaiming of rubber, and the Joule effect. A brief review and discussion of the phenomena and past theories of vulcanization have also been given.

Solvents and Swelling Agents for Rubber

THE following tabulation of solvents and swelling agents for raw rubber is taken from a recent article[1] in which the author stated the aims of the investigation to be : (1) To extend considerably the range of new solvents and swelling agents for industrial products such as rubber and cellulose esters. (2) To examine more thoroughly the broad relations existing between the chemical architecture of the colloid substance and the swelling or dispersing medium, ionic effects in this case being negligible or absent. Incidentally the results indicate a wide field for the preparation of new glues and films of adhesives.

The table below is partial and confined to the effects of solvents used on raw rubber only. The term "action" refers to swelling or dispersion or combination of both.

No.	Organic Liquid	Raw Rubber
1.	*n*-Hexane	Cold, rapid swelling
2.	*n*-Decane	Cold, slower swelling. Total amount of swelling about same for 1 and 2 under comparable conditions
3.	Trimethylethylene.	Cold, strong swelling action
4.	ψ-Cumene	Cold, strong swelling leading to solution
5.	*p*-Cymene	Cold, very strong swelling
6.	Tetrahydronaphthalene	Cold, strong action
7.	Pinene	Cold, very strong swelling
8.	Ethyl acetate	Cold, no action
9.	Ethyl acetoacetate.	Cold, no action
10.	Ethyl cyanoacetate	Cold, no action
11.	Ethyl trichloroacetate	Cold, strong but slow action Hot, solvent
12.	Amyl formate	Cold, pronounced swelling Hot, non-solvent, but strong swelling agent
13.	Amyl valerate	Cold, pronounced swelling Hot, non-solvent, but strong swelling agent
14.	Butyl stearate	Cold, pronounced swelling Hot, solvent
15.	Ethyl orthoformate	Cold, action nil or slight
16.	Ethyl oxalate	Cold, action nil or slight
17.	Ethyl cinnamate...	Cold, moderate swelling Hot, dispersed completely
18.	Methyl benzoate...	Cold, very strong action Hot, solvent
19.	*iso*Amyl benzoate..	Cold, very strong swelling Hot, solvent
20.	Methyl salicylate..	Cold, strong action Hot, dispersed rubber readily if not quite completely solvent
21.	Butyl phthalate...	Cold, action slight Hot, dispersed completely on boiling
22.	Phenyl butyrate...	Cold, very strong swelling Hot, dispersed almost completely on vigorous boiling and shaking
23.	Ethyl collidinedicarboxylate ...	Cold, action slight Hot, completely dispersed with difficulty
24.	Vinyl acetate ("practical") ...	Cold, moderate swelling Hot, very difficult to disperse
25.	Citronellyl acetate.	Cold, slight action
26.	Allyl bromide	Cold, action slight Hot, could not disperse
27.	Acetic acid	—
28.	Thioacetic acid....	—
29.	*n*-Hexoic acid.....	—
30.	*n*-Undecoic acid...	Cold, action slow; appreciable dispersion after several days Hot, readily and completely dispersed
31.	Undecenoic acid...	Cold, action slight
32.	Lactic acid	Cold, action nil or slight
33.	Pyruvic acid.....	Cold, action slight Hot, did not disperse appreciably on boiling
34.	Oleic acid	Cold, moderate swelling Hot, partially dispersed
35.	Acetonitrile	Cold, no action
36.	Diethylacetonitrile.	Cold, moderate swelling only Hot, could not disperse readily
37.	Phenylacetonitrile.	Cold, action only slight
38.	Chloroacetaldehyde.	Cold, swelling negligible: rubber-colored bluish-grey by liquid
39.	Aldol	Cold, action nil or slight Hot, did not disperse appreciably on boiling
40.	Heptaldehyde	Cold, very strong swelling solvent
41.	Cinnamaldehyde...	Cold, action nil or slight Hot, not dispersed appreciably on boiling
42.	Salicylaldehyde ...	—
43.	Citronellal	Cold, action slight Hot, very difficult to disperse on boiling
44.	Furfuraldehyde ...	Cold, action nil or slight
45.	Furfuryl alcohol..	Cold, action nil or slight
46.	*cyclo*Hexanol	—
47.	*iso*Amyl alcohol...	Cold, action nil or slight Hot, rubber softened, but little dispersion on boiling
48.	*tert.*-Amyl alcohol.	Cold, action nil or slight
49.	βγ-Dibromopropyl alcohol	Cold, action nil or slight Hot, rubber softened, but did not disperse appreciably on boiling
50.	Cineole	Cold, very strong swelling Hot, solvent
51.	Terpineol	Cold, action slight Hot, fair swelling; could not disperse appreciably on boiling.
52.	Cinnamyl alcohol..	Cold, action nil or slight
53.	Trimethylene glycol (commercial) ...	Cold, action nil or slight
54.	Diethylcarbinol ...	Cold, no action (?) Hot, did not disperse appreciably
55.	Phenyldimethylcarbinol	Cold, very pronounced swelling
56.	Dimethyl-*n*-butylcarbinol	Cold, slow swelling
57.	Diacetone alcohol..	Cold, action nil or slight Hot, moderate swelling; did not disperse on boiling
58.	Methyl tolyl sulphide	Cold, pronounced swelling
59.	Thiophen	Cold, pronounced swelling Hot, difficult to disperse completely
60.	Pyrrole	Cold, slow action
61.	Pyridine	Cold, strong action Hot, very difficult to disperse on boiling, but given a well-swollen jelly
62.	"Methylpyridine"..	Cold, very strong action
63.	Piperidine	Cold, very strong action Hot, very difficult to disperse on boiling; non-solvent
64.	*iso*Quinoline	Cold, moderate action Hot, could not disperse appreciably
65.	Xylidine	Cold, fair action
66.	Phenylhydrazine...	Cold, action nil or slight Hot, could not disperse appreciably on boiling
67.	Diethylamine	Cold, strong swelling
68.	Benzylmethylamine	Cold, moderate swelling Hot, no very appreciable dispersion on boiling
69.	Triethanolamine ..	Cold, no action
70.	Methyl *p*-tolyl ketone	Cold, moderate swelling Hot, only partial dispersion
71.	Iodobenzene	Cold, strong swelling
72.	Benzylidene chloride	Cold, strong swelling followed by dispersion; solvent
73.	Amylene dichloride	Cold, strong swelling
74.	"Cellosolve" (ethylene glycol monomethyl ether) ..	Cold, action nil or slight Hot, could not disperse on boiling
75.	Tetranitromethane.	—

In about 60 of the preceding tests the mixture of colloid and organic liquid was heated after keeping for several days at room temperature. In 40 of these tests it was found that if the colloid did not swell or swelled only slightly to moderately it could not be dispersed appreciably at higher temperatures up to the boiling point of the liquid. Moderate to strong swelling at room temperature led in general to ready dispersion on heating or boiling in those cases where dispersion had not already occurred at room temperature. In the remaining 20 tests the results were somewhat unexpected.

It is possible to have strong and rapid swelling and only exceedingly slow dispersion even at the boiling point of the liquid and with constant agitation of the mixture. This is illustrated by pyridine or thiophen and raw rubber. Again amyl formate and valerate are strong swelling agents but non-solvents for rubber. Swelling may be only slight to moderate at room temperature; yet the colloid may disperse readily and completely on heating. This case is illustrated by "cellosolve" (ethylene glycol monomethyl ether) and cellulose acetate or by butyl phthalate and either raw rubber or cellulose acetate. A colloid

[1] "Solvents and Swelling Agents for Organophilic Colloids." W. B. Lee, *J. Soc. Chem. Ind.*, May 16, 1930, 226T-29T.

may swell only very slowly, but finally appreciably. Raw rubber and undecoic acid illustrate this case.

On heating sufficiently the undecoic acid becomes a rubber solvent. It appears desirable to emphasize the varying influence of temperature on the swelling and dispersion of organophilic colloids since some investigators, Fenton and Berry, restricted their observations to room temperature, and their results were incorporated by Whitby into his comparative observations on the swelling and dispersion of cellulose acetate and raw rubber.

Conclusions

The results show that, in general, solvents or swelling agents for raw rubber are non-solvents or non-swelling agents for cellulose acetate and celluloid. This fact is related to the distribution of polar groups and the size of the hydrocarbon chain or residue of the organic liquid.

Important and well-defined exceptions to the above rule were found. Methyl and ethyl benzoates are noteworthy, being solvents for both cellulose acetate and rubber, and strong swelling agents for celluloid.

Among the 80 organic liquids used, a large number of apparently new solvents or swelling agents for important industrial organophilic colloids are reported.

Ti-Tone

Ti-Tone is a titanium lithopone of the following approximate percentage composition:

Titanium dioxide	15
Zinc sulphide	25
Precipitated barium sulphate	60
	100

It has a specific gravity of 4.25 and covering power approximately 60 per cent greater than that of ordinary lithopone. Its rate of cure and reenforcing effect depend to a slight extent upon the accelerator used. In these respects comparison shows somewhat in favor of Ti-Tone as compared with lithopone. Neither exerts appreciable effect on the aging properties of compounds containing them. As to fastness to light, Ti-Tone is slightly superior to the best "light fast" lithopones and decidedly superior to the ordinary grades of lithopone.

Albatar

Albatar is a softening ingredient of such compounding quality that it gives the stock highly adhesive quality for permanent attachment to the underlying construction, not only forming a perfect union with the black tread stock but preventing the discoloration caused by the use of ingredients usually employed to obtain these effects.

The addition of softeners does not accomplish the desired results because softness in stock is not the same as adhesiveness. Furthermore, sidewall stock should be firm and tough. The use of most softeners which may be employed in white rubber compounds is usually accompanied by sacrifice in tensile strength and abrasive resistance. In the case of Albatar this is not so.

American Rubber Technologists

Over 400 technical superintendents, chemists, and process development engineers in rubber plants and laboratories have submitted biographical data, to the interest of our readers. Was yours included? If not, we shall be pleased to publish it also. Shall we send you a data sheet?

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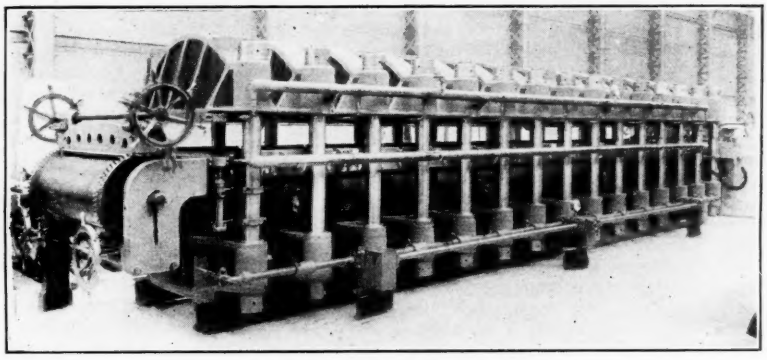
New Machines and Appliances



Shaw Belt Vulcanizing Press

Hydraulic Belt Press

AN hydraulic belt press of English design and manufacture is represented in the illustration here shown. The noteworthy features of this press are numerous and interesting. It is fitted with forged steel steam chests 36 feet long by 5 feet 3 inches wide. It is operated by 30 rams, 13 inches in diameter, and gives a total loading of approximately 4,000 tons. A special serpentine steam heating is arranged in the platens to insure the same temperature over the whole area.

Each end of the press is fitted with a belt gripping and stretching gear, hand operated through machine cut worm and spur gearing. This mechanical gear shows a marked improvement over the usual hydraulic type as the stretch on the belt is constant over the whole width and can be regulated to suit the varying qualities of belt manufactured.

Provision is made to insure equal lifting of all rams, and the guiding of the bottom chest has been designed to allow for the expansion due to heating. The approximate total net weight of the press is 150 tons. Francis Shaw & Co., Ltd., Manchester, England.

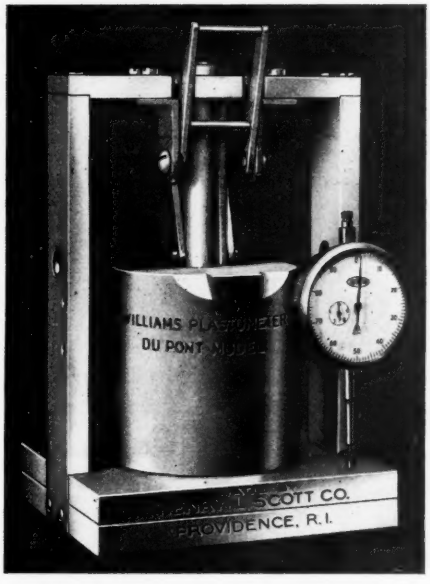
Williams Plasticity Press

THE DuPont model of the Williams plastometer is designed to assist in producing stocks which will process in a uniform manner. This instrument provides a method of studying the consistency of crude rubber, the "breaking down" of rubber during milling, the effects of softness, and accelerators, and the tendency of stocks to precure.

The plastometer has two parallel plates lying in a horizontal plane. The top plate is raised and lowered always parallel to the bottom plate, and the distance between the plates is measured by a dial gage attached to the upper plate.

Operation of the instrument is conducted as follows: The testing sample should be 2 cubic centimeters in volume and approximately spherical in shape. This volume is obtained by taking the number of grams equal to twice the specific gravity of the stock. The press and the test piece should be kept at constant temperature. This temperature depends on the type of stock and its purpose and is generally between 70° and 100° C.

To make the test place the sample between two sheets of paper to keep it from adhering to the plates. The rubber will adhere to the paper. The gage can be conveniently set to zero with the two thicknesses of paper between the plates. This provides the correction for the thickness of the paper. The sample is then placed in the center of the plates, and the "thickness-time" curve is obtained from the thickness of the sample in centimeters shown on the gage at selected time intervals in minutes. The usual procedure is to run the test for either three or five minutes and use the thickness of the sample at the end of the time as the measure of relative plasticity. Henry L. Scott Co., Providence, R. I.



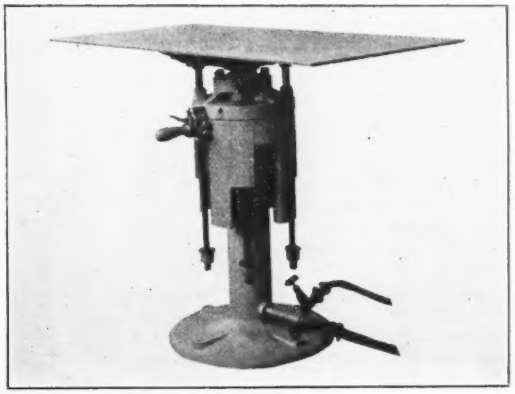
Williams Plastometer—DuPont Model

Hydraulic Mold Elevator

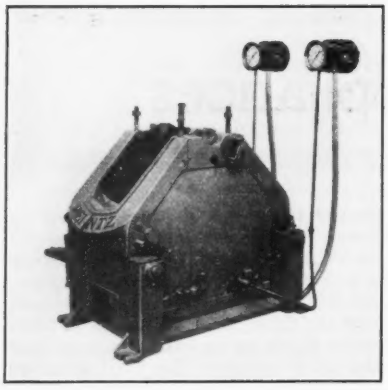
WHERE multiple opening hydraulic presses are used a mold elevator will increase production by facilitating mold handling and speeding up loading and unloading of the press. Not only can the heavy molds be more quickly raised or lowered to and from the various press decks, but the work is easier for the operator.

All openings may be served from one side of the press if desired, and it is sometimes possible for one operator to handle more than one press. To obtain the maximum benefit, the table should be stopped at the exact level of each opening to be served.

The mold elevator consists of a semi-steel cylinder with a steel ram supporting a cast-iron head upon which is bolted a steel boiler-plate table. To the cast-iron head are attached steel rods, with nuts and washers at the lower ends. These rods serve as guides to keep the table from twisting as it is raised or lowered, and the nuts and the washers engage the steps in the stop collar to stop the table at the height desired. The stop collar turns in a groove cut in the top of the cylinder and is provided with a handle and a latch so that it may be locked in position. The latch is en-



Farrel-Birmingham Mold Elevator



Heintz Sectional Repair Mold

gaged by holes drilled in the fixed collar cast integral with the cylinder, and these holes correspond to the different openings of the press.

When the table is in its lowest position, it is on a level with the fixed work bench where the molds are filled, and this level also corresponds with the lowest opening of the press. To serve the next higher opening the stop collar is moved by the handle to the next latch hole, bringing the lowest step of the stop collar over the washers at the lower ends of the stop and the guide rods. The other openings are served in like manner by moving the stop collar still farther to the left. The stop collar is provided with as many steps as there are openings in the press to be served.

This device provides positive control of the stopping of the table by setting the latch at the proper point for the opening of the press which is to be served. Adjustment of the nuts and the washers at the lower ends of the stop and the guide rods can be made so that the table and the press plates may be accurately alined. The elevator can be designed for any hydraulic pressure and for any reasonable number of openings in the press, and the steel table may be of any size desired. Farrel-Birmingham Co., Inc., Ansonia, Conn.

Bus Balloon Tire Repair Mold

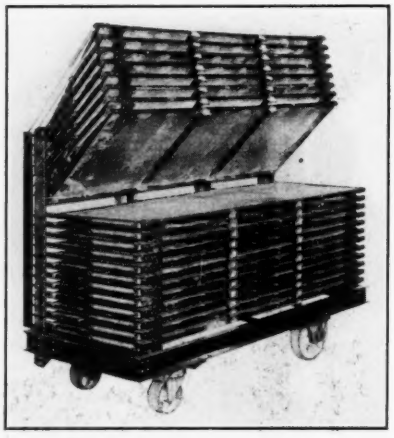
THE rapidly increasing use of balloon tires for busses and trucks has necessitated the development of special repair equipment with which to service such tires. The illustration represents the latest and largest sectional tire repair mold thus far produced. It provides a minimum cavity width of 10½ inches and maximum of 14¼ inches to handle 11.25, 12.00, 12.75, 13.50, 14.25, and 15.00 bus balloon tires and also 10-inch high pressure tires.

To accommodate this wide range of sizes and thus minimize the necessary equipment investment, the cavity of the mold pictured is divided into two closely machined sections with special width adjustment of exclusive design. Each side of the mold is a self-generating electric steam unit equipped with its own heating units and control device, thus eliminating gasket joints and packing. Each half of the mold is equipped with pressure gage, thermometer, water gage, and safety device.

Although 14.25 and 15.00 bus balloon tires are not yet being produced, these larger sizes have been provided for in the mold. This new tire repair mold was designed and developed in association and with the cooperation of tire manufacturers' design and development department engineers. James C. Heintz & Co., 3738 W. 143rd St., Cleveland, O.

Slab Cooling Truck

ALL industries are faced today with serious problems in the economic handling of materials. In the rubber industry properly designed labor-saving equipment is daily becoming more important in this connection. One such piece of equipment, designed especially for processing stock in the mass production of heels, is here illustrated. It is known as a heel slab cooling rack, but it is much more than a simple rack because it is durable, portable, workable, and embodies an automatic feature in its mechanism.



Economic Slab Cooling Truck

This piece of equipment is of all metal construction erected upon an angle iron framework mounted at one end on a pair of 12-inch stationary wheels and at the opposite end on a pair of 7-inch double bearing casters. All of this running gear is fitted with Hyatt bearings.

The rack comprises twenty shelves, 26 by 78 inches, each stiffened and spaced apart at 1½-inch intervals by steel angle cleats hinged at one edge to four angle uprights. Each shelf, at both ends, has a rod and coil spring attachment which serves to hold the empty shelf elevated at an angle to facilitate loading and unloading the slab stock.

The rack is conveniently removable from mill and calender to cutting department by one-man power and is easily manageable through doorways and on and off elevators by reason of its proportions and ball-bearing casters. Economic Steel Rack Co., Everett, Mass.

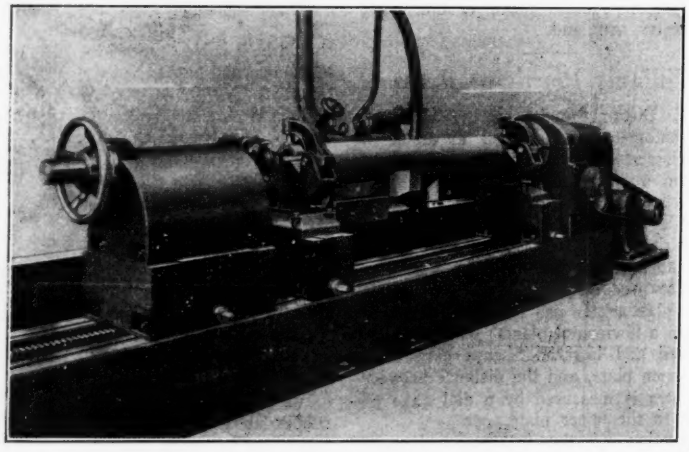
Roll Grinding Lathe

THE grinding and truing of rubber covered rolls, particularly the press rolls of paper-making machines, must be most accurately done. This work is therefore performed on a lathe of heavy construction and designed with special reference to the extreme accuracy necessary.

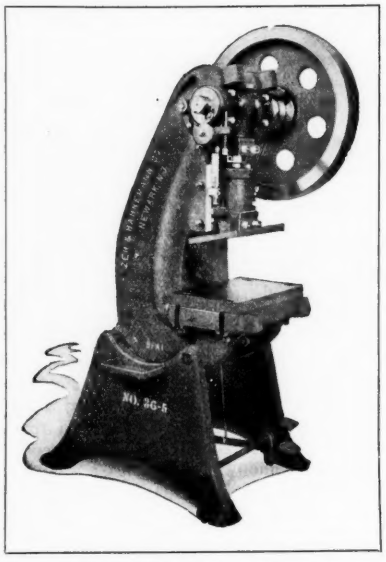
The illustration shows the rear view of a roll grinder for such work. Regarding details of construction: the mechanism is mounted on a low, heavy bed frame long enough to accommodate a roll 315 inches long by 118 inches diameter, supported in open roller bearings on pedestals.

The work may also be supported between centers or on adjustable pedestals. The motor drives are housed; the one rotating the work is contained in the head of the machine and that for the grinding wheel in the carriage. It is provided with two speeds actuated by a motor-driven lead screw. For rubber grinding, an air bellows removes the dust from the grinding wheel, which is guarded by a housing provided with a dust discharge outlet.

The machine is so constructed that a special attachment can be added for crowning the surface of the work, in other words, for spherical convex grinding of rolls. For this purpose an intermediate carriage is arranged which is advanced toward or withdrawn from the work by an adjusting device contained within the carriage. The amount of crowning desired



Haubold Rubber Roll Grinder—Rear View



Reclinable Power Press

is controlled by a thread spindle in the front of the carriage, and its amount can be read on a scale. C. G. Haubold A. G., Chemnitz, Germany.

Reclinable Power Press

A POWER press of the reclinable type such as that pictured is very useful in a tire or a mechanical rubber goods plant particularly. While being the most suitable and favored type for general stamping work, it is convenient also for stamping out aluminum labels for hose of all kinds, particularly when of large size, as in the case of railway airbrake hose labels.

Some special features of the press include the following: The frame is of heavy construction in which the material is properly distributed, and sharp corners inviting fracture are avoided. The clutch is strong, simple, durable, and non-repeating. The press will not make a second stroke even if the treadle is not released. It can be made repeating for continuous work by throwing over a small well-locked lever.

A friction clutch suitable for high speed work up to 600 strokes per minute can be furnished, also two-lever safety operating devices instead of the treadle. The manufacturers are prepared to furnish roll feeds, dial feeds, and grip feeds.

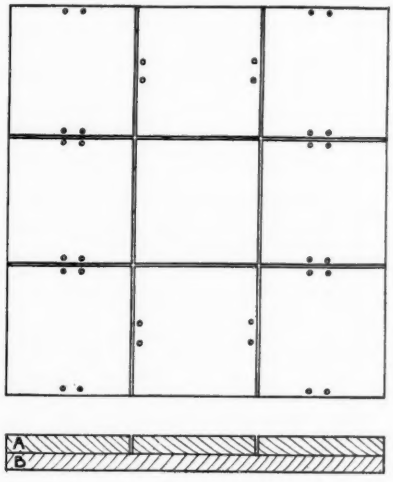
The various other details of construction and equipment have received careful consideration and are all appropriate to the design and safe operation of the press. The reclining position to 40 degrees is a third more than usual and can be obtained with perfect safety by means of hand wheel and screw. Zeh & Hahnemann Co., 182-200 Vanderpool St., Newark, N. J.

Overflow Preventive Mold

A DESIDERATUM in molding rubber articles is that they be formed free of overflow; in other words, to come from the mold cavities automatically trimmed.

In a 2-plate mold as ordinarily made, single plates of the same area are fitted together to form the mold. When heated, to shape and cure the rubber article, the two plates expand more or less unequally, thus interfering with registration of the mold and causing overflow to form around the articles.

It has been found that mold registration can be maintained in 2-part molds by constructing them on the plan indicated in the illustration. This indicates in plan and cross-section a 2-part mold, the upper and the lower parts of which are marked respectively *A* and *B*. The upper part *A*



Goodactive's Finless Mold

is subdivided into squares corresponding in number to that of the cavities. A space interval is allowed around each subdivision, and a hardened trimming edge is formed around each cavity in the bottom plate *B*.

As a result, the latter will register perfectly on the top portions *A*. Thus differences of expansion are eliminated, and the molded articles are obtained finless. United States Tool & Machine Works, 27 Thames St., New York, N. Y.

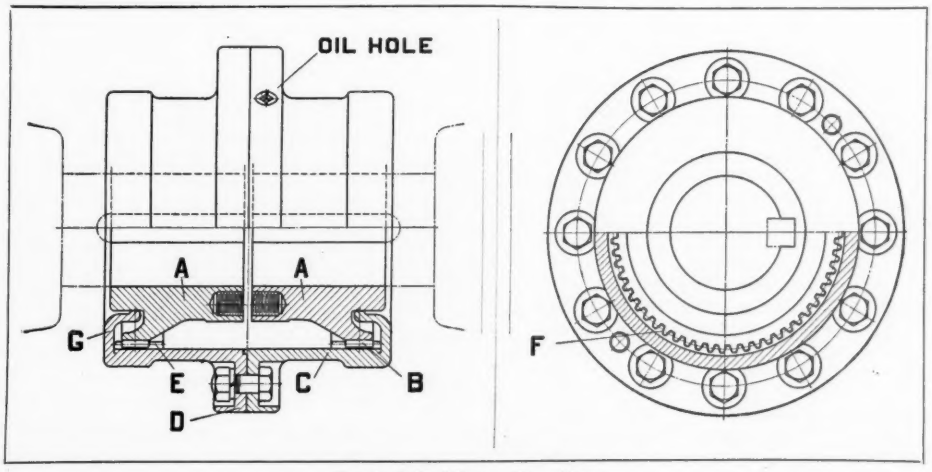
Self-Alining Coupling

THE problem of misalinement in shafting has been uniquely solved in the coupling shown at the bottom of this page, by elimination of all flexible materials. Two spur gears are in complete and continuous mesh with the internal gears of a floating sleeve. The sleeve takes a neutral position; the error of misalinement is taken up between the lubricated faces of the gear teeth, and all necessity of flexible materials is done away with.

Referring to the accompanying illustrations, the coupling consists of two hubs, *A*, *A*, each keyed to its respective shaft. Each hub has its generated splines *B* cut at the maximum possible distance from the shaft end. Surrounding the hubs is the casing or sleeve *C*, which is transversely split in its center and bolted together by flanges *D*. Each half of this sleeve has generated internal splines *E* cut on its bore at the end opposite its flange. These internal splines engage the external splines as shown at *F*. Supporting rings *G* positively control the center line of each shaft, intercepting the center line of the sleeve at the transverse center lines through the load carrying surfaces.

A slight clearance between the external and internal splines permits a definite error of alinement between the two shafts. The error between the splines, due to the principle of the design, is only a small fraction of the corresponding error of alinement between the shafts. In other words, the error of alinement between the spline faces is reduced to one-tenth the error of the shaft alinement. The Bartlett Hayward Co., 212 Scott St., Baltimore, Md.

ADVANTAGE IS TAKEN OF THE RESILIENCY of gas in the making of a new golf ball core. Rubber tape is wound on a small sphere composed of ammonium chloride, sodium nitrate, and magnesium sulphate, and then such taped sphere is heated to get a gas reaction. With such a core a very long flight is said to be obtained. U. S. Patent 1,752,735, April 1, 1930.



Fast's Self-Alining Coupling

Deplore Tire Price Cut

THAT the June 5 cut in the price of tires was ill-advised and without economic justification is the general view of financial leaders. Such reduction, especially when applicable to all purchases made since May 5, seems like a needless gratuity. They can not understand why tire makers should deliberately disregard a unique advantage that other manufacturers would turn to the utmost account. Assuming that the objective was the stimulating of sales beyond normal, they are confident, too, that it has failed.

It is pointed out that the rubber trade was just getting into a strategic position where it could seek and obtain profits that would have largely made up for the long, lean period in the recent past when net returns were either very small or nonexistent. Ordinarily prices are cut in dull times to stimulate purchasing, but in this case the anomaly is presented of reductions being made when a seasonal wave of consumer buying had just set in and when an extra incentive to buying was evidently superfluous. As such observers see it, the tire price cut was out of all proportion to the decline in rubber and cotton prices.

Many trade students believe that the early estimate of 50,000,000 tires for replacement will prove to be excessive, perhaps by more than 5,000,000. They marvel at the courage of the tire makers, who, after counting on the profit on replacements to help make up for the smaller original equipment business expected in 1930, took a chance on discarding needed profits and writing down finished inventory as of June 30, especially after contending with so many adverse conditions since the first of the year that tended to diminish earnings.

The experience of The Goodyear Tire & Rubber Co. is cited as particularly illustrating the untoward result of apparently unwarranted price-cutting. Profit for the first quarter of 1930 was about $1.75 a share on the common; yet were it not for the June 5 price cut, it is estimated that the profit for the second quarter would exceed that of the first. Still the half year's common dividend of $2.50 is likely to be earned by a fair margin. In the first half of 1929 the company earned $7.02 on the common.

General Tire & Rubber Co. is reported to be more than holding its own while doing a high-grade tire replacement business solely. Despite unfavorable conditions in the trade, it is believed that General's 1930 earnings will vie with its best. Many of the small companies are, however, not so fortunate. With prices cut so low as to be practically profitless and unable to afford the economies of big-scale low-unit cost, few of them are expected to break even, and some will probably not survive 1930. They have not even the advantage of making other lines of goods, for through diversification of products many of the big rubber companies may in the remainder of the year even recoup a large part of the loss being sustained by reason of the cut in tire prices.

The market-wise hold that until the June 5 price cut came, The B. F. Goodrich Co. had an excellent chance of earning enough to offset a $400,000 loss after depreciation, but before interest and taxes, in the first quarter. Now a profit is not expected although it is conceded that the company has greatly strengthened its financial position and is in prime shape to reap benefits when trade improves.

United States Rubber Co. is expected to report a deficit for the first half of 1930, as compared with a net of $596,926 for the first six months of 1929. Much of this temporary setback is admitted to be due to the thorough internal reorganization to which the company has been subjecting itself, the unquestioned advantages of which must reveal themselves in a short time, and all of which has been carried on by its strong personnel without new financing.

Firestone Tire & Rubber Co. is likely, the financial analysts believe, to report a less profitable half year on October 31 than on April 30, when it gave the net for the preceding six months as $2,320,118, equal, after preferred dividends, to 23 cents a share on the common, against dividend requirements of 80 cents. Carrying crude rubber at around 16 cents, although it has recently been below 11, is also regarded as a drawback. Yet they admit that there is a possibility of the resourceful, aggressive management springing a favorable surprise on the "Street."

The position of the Fisk Rubber Co. is regarded with especial concern. For the first six months of 1929 it reported a net loss of $236,713, and it is expected that, due to a combination of adverse circumstances, including the tire price cut, the net loss for the fore part of 1930 will be even heavier.

Propeller Shaft Protector

Rubber Precludes Contact of Sea Water with Steel Shafts

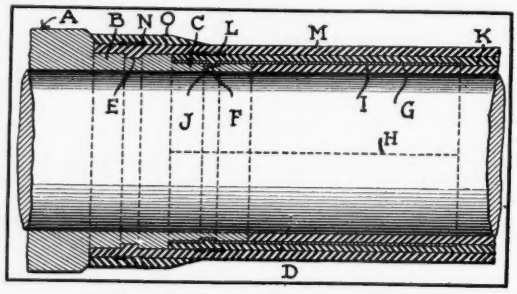
AN EFFICIENT construction recently patented[1] relates to a means for protecting with rubber, the propeller shafts of water craft from electrolytic pitting action set up by access of sea water to the metallic parts. The protection takes the form of an absolutely watertight fitment comprising a metallic sleeve sealed to one end of the bearing and extending along the shaft.

This construction precludes access of water to the shaft, by the plan of construction indicated in the figure which represents the device in longitudinal section.

The bearing *A* is provided with several reduced portions such as *B* and *C* placed in step relation along the shaft *D*. The reduced portion *B* has a circumferential groove *E*, and the reduced portion *C* has a similar groove *F*. The portion of the shaft extending beyond the reduced portion *C* is coated with a suitable rubber cement such for example as one containing zinc oxide, dibenzylamine, and sulphur. This is vulcanizable by subjecting it to the action of carbon disulphide. In this connection, see Cadwell U. S. Patent No. 1,466,794, August 4, 1923.

Resuming the construction shown in the figure, a layer of sheet rubber composition *G* of the thickness of reduced portion *C* is applied around the shaft *D* and joined at its longitudinal edges to form a watertight seal. Next a sheet of thin copper is placed around the rubber layer *G*, and the lengthwise edges of the metal sheet are joined by brazing along line *H* forming a sleeve *I*. One end of this sleeve overlaps the portion *C* and is sealed upon it by brazing or is crimped in the groove *J*.

The sleeve *I* is coated with rubber cement on its exposed surfaces. A sheet of rubber composition *K* is next placed over the sleeve *I* with its end abutting the reduced portion *B*, and the lengthwise edges of *K* joined similarly to those of *G*. A metallic clamping band *L* encircles the rubber layer *K* to reenforce its connection at the groove *J*. In a similar way the rubber layer *M* is applied over *K* and clamped at *N* to the groove *E*. Finally a short bevel edged layer of rubber *O* is applied over layer *M* to protect the clamping band *N*.



Rubber Sleeve for Propeller Shafts

This construction precludes contact of the sea water with the steel shaft *D* because it is protected by the vulcanized rubber covering. If for any reason the end of the rubber covering should become loosened so as to permit leakage, the water could not reach the shaft until it had traveled along the outer surface of the metal sleeve *I* and returned along its inner surface. This could only occur if the bond between the rubber and the metallic sleeve happened to be destroyed on both sides of the sleeve.

[1] United States Patent No. 1,755,387, Apr. 22, 1930.

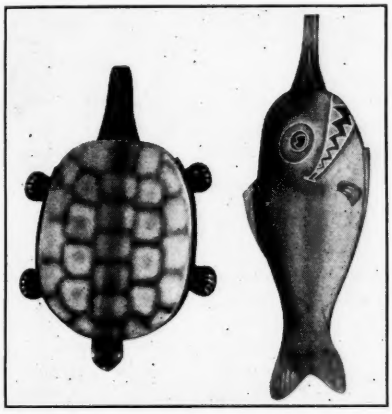
New Goods and Specialties

Novel Bathing Bags

MILADY had readily accepted the convenience of the rubberized bathing bag. But, of course, she wants style as well as serviceability, and she prefers the bag that is different. Two attractive models, the Turtle and the Fish, shown herewith, have an appeal all their own.

They are fashioned of three shades of strong rubberized suede material beautifully colored in attractive polychrome hues. The Turtle is 9 by 12 inches, and the Fish 9 by 15. The bags are made either with snap buttons or talon slide fasteners. The colors are fast, the material waterproof.

These bags may be used also for premiums or advertising specialties. A purse



The Turtle and the Fish Beach Bags

pocket can be put on either model, with a name or initials stamped on it. Or these may be printed on the handle. The Dura-Products Mfg. Co., Canton, O.

Rubber Protects Housewives' Hands

THE Saf-Way Holder is a rubber container made for the housewife who is dainty, clean, and wishes to keep her hands tender and beautiful and at the same time protect them from infection and danger which arise from using steel wool alone.

The holder is made so that it may get into corners and difficult places with least effort. It is specially adapted to fit any hand comfortably and shaped to clean and polish equally well any surface. While primarily made for protection and sanitation, its value as an aid in work is not a secondary consideration. The Saf-Way Holder is flexible, and pressure may be applied in order to reach corners and increase the friction at the same time, so that any substance may be removed quickly and with little effort.

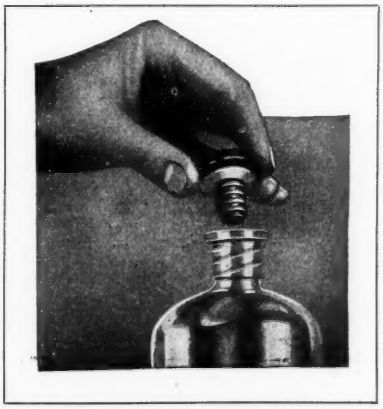
The Saf-Way Holder is made in two

Saf-Way Holder

sizes: No. 1, for utensils and kitchen work; No. 2, for cleaning tile, removing paint, scrubbing floors, etc. The holder may be used also as a sink stopper and a suction cup. When the special steel floss that does the cleaning is worn out, the holder may be refilled. Arlington Products Co., Arlington, N. J.

Spring Stopper Seal

THE new device for stoppering vials as here pictured is now being employed by druggists for dispensing such liquids as aromatic spirits of ammonia, mineral oil, shampoo liquids, iodine, etc. The improvement featured is a threaded stopper with mushroom top. The material of the stopper is either glass or a hard molded composition. A rubber washer is sprung over the stopper with a bearing against the underside of the top. When screwed to place in the neck of the bottle, the washer makes a tight closure by compression of the rubber between the bottle top and the stopper top. In molded composition this style of stopper is well adapted for receiving a cemented-in glass rod for applying iodine, etc., to the surface under treatment. The closure effected by this device gives perfect protection against evaporation. Spring Stopper Co., 165 Broadway, New York, N. Y.



Spring Stopper Seal

Rubber Sandals for Sudden Showers

BEING caught in the rain is most annoying, especially when your feet become saturated and your shoes are ruined. How often does an unexpected downpour bring the thought, "If I only had my rubbers with me." Yet at best they are cumbersome to carry, and no one likes to spoil the effect of a charming costume by wearing rubbers when it is not wet outdoors.

Now, however, come rubber sandals fashioned just for such an occasion. The "Snapon" rubbers will prove a boon to victims of sudden showers. For these shoe protectors are quite inexpensive, easily available, and satisfactory in use. The low price makes possible their ready sale at numerous stores where notions are

Rubber Shoe Protector

sold. These stores, of course, are those most frequented by shoppers or by pleasure seekers of necessity searching shelter from the rain.

The "Snapon" itself, as seen from the illustration, is a sandal which slips over the front part of the shoe and snaps across the instep. The rubber holding the snap fasteners in place has a backing for reenforcement. The "Snapons," which are light in weight, appear in one size only and fit well over any slipper. Another convenience is that each rubber may be worn on either left or right foot, and the fit is neat indeed. The rubber is fully vulcanized, just as with a more expensive article. These rainy-day accessories are made in two colors, black and brown. An added feature is the pouch designed to contain these rubbers. It is all rubber, in red, blue, or green, and of small size to fit easily in milady's pocket or purse. The Snapon Rubber Shoe Co., Watertown, Mass.

Editor's Book Table

Book Reviews

"The Prevention of Ice Hazard on Airplanes." By William C. Geer and Merit Scott. Technical Notes, National Advisory Committee for Aeronautics, No. 345, Washington, D. C., July, 1930. Paper covers, 8½ by 11 inches. 24 pages, plus 4 pages of diagrams and 2 pages of photographs.

This report recounts the researches underlying an invention that will remove a serious menace to aviators and make much safer flying under ice forming conditions as winter, etc. The report discusses the formation and adhesion of ice on a plane in flight, the possible means of preventing ice formation, and the construction and operation of the ice removing overshoe.

Further development work is outlined in order to perfect the design of these ice removing overshoes and the accessory mechanical equipment necessary for its successful operation in service.

"Fünfsprachiges Wörterbuch fur den Gummiwarenhandel." Published by Union Deutsche Verlagsgesellschaft, Zweigniederlassung Berlin, Germany. Board covers. 140 pages.

This five-language dictionary (German, French, English, Italian, and Spanish) for the rubber trade attempts to fill a need which undoubtedly exists. Unfortunately, however praiseworthy the effort may be, the numerous errors of various kinds in which the little compilation abounds detracts considerably from its usefulness. A glance over the English equivalents shows many mistakes like "eyes-bath"; misprints are far too frequent; while expressions like "dolls sucking," "stuffs for gaberdines," "beltings adhesive fad," "disks cutting," "hoses-making machine," "eyes-dropping glass," "rolling cover," "bacon rubber," etc., leave entirely too much to the imagination.

"The Condensed Chemical Dictionary." Compiled and edited by the editorial staff of the *Chemical Engineering Catalog*, Francis M. Turner, Editor. Second edition, completely revised and enlarged under the supervision of Thomas C. Gregory, editor, Isabelle M. Welch, assistant editor. The Chemical Catalog Co., Inc., 419 Fourth Ave., New York, N. Y. 1930. Cloth, 551 pages, 6 by 9 inches. Thumb indexed. Price $10.

This work is described as a reference volume for all requiring quick access to a large amount of essential data regarding chemicals and other substances used in manufacturing and laboratory work.

The dictionary is arranged in a straight alphabetical classification and in addition to the chemical names of materials and descriptive data, the grades, containers, uses, and railroad shipping regulations are given.

The book is unquestionably valuable as a ready reference, although to rubber men it is passing strange to read that ebonite and soft rubber are varieties of caoutchouc and to find no reference to the fact that its chief sources are plantations of *Hevea brasiliensis*. Also balata is not described under that name but is listed under chicle as a variety. This is an evident error as also is the statement that balata is used in the manufacture of chewing gum. The derivation of pontianak is given correctly as from a species of *Dyera* and also incorrectly as from *Parthenium argentatum*, the guayule shrub. Reference to guayule is otherwise omitted.

New Publications

"La Coloration du Caoutchouc." By F. Jacobs. Reprint in French from the *Revue Générale du Caoutchouc*, 18 Rue Duphot, Paris, France. A complete review of the subject of rubber colors is discussed in their scientific and practical aspects. The data is drawn from the most dependable sources and the latest practice in rubber technology and is presented in most systematic form.

"Aging of Compounds Containing Rosins." Laboratory Report No. 146. E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. A study of the adverse effect of rosin on the aging of rubber compounds that contain it. The purpose of the tests described was to determine how effective Neozone D might be in offsetting the tendency of rosin to accelerate oxidation.

"Timken Bearings in Rubber Mill Equipment." The Timken Roller Bearing Co., Canton, O. An illustrated 20-page pamphlet giving the latest information covering mounting practices and general data concerning the application of tapered roller bearings to practically every sort of machine used in the rubber industry.

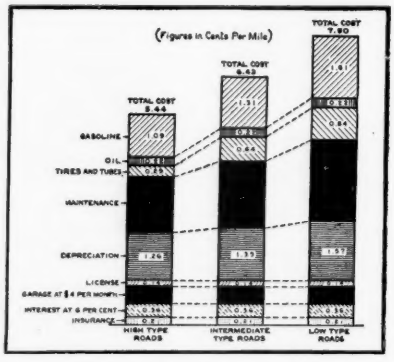
"Changes in Customs Administrative Provisions under the 1930 Tariff Act." The Merchants' Association of New York. This booklet is published for free distribution among the members of the association with the aim of assisting manufacturers, importers, and exporters to avoid mistakes in procedure under the new tariff act, which might prove exceedingly costly both in time and money. The booklet was written by Benjamin A. Levett, customs expert and chairman of the Merchants' Association's Committee on Customs Service and Administration. Before publication the work was approved by the entire membership of the committee.

"Ti-Tone." Laboratory Report No. 147. E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. In this report tests are given showing the relative abrasion resistance of ordinary lithopone, Ti-Tone, and the titanium lithopone known as Titanox B. The report concludes with a summary of the physical properties and compounding characteristics of Ti-Tone.

Cost of Operating an Average Automobile

The following tabulation and chart taken from *Highways Handbook* published by the Highway Education Board, Washington, D. C., shows the relative cost of operating an imaginary "average" automobile on various classes of roads. Annual mileage of 11,000.

Item of Cost	Approximate relative cost of operation in cents per mile: High type roads	Intermediate type roads	Low type roads
Gasoline	1.09	1.31	1.61
Oil	0.22	0.22	0.22
Tires and tubes	0.29	0.64	0.84
Maintenance	1.43	1.72	2.11
Depreciation	1.26	1.39	1.57
License	0.14	0.14	0.14
Garage at $4 per month	0.44	0.44	0.44
Interest at 6 per cent	0.36	0.36	0.36
Insurance	0.21	0.21	0.21
Total cost	5.44	6.43	7.50



Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

Number	Inquiry
1280	Complete list of makers of machinery for manufacturing dipped rubber goods.
1281	Manufacturer of chlorinated rubber.
1282	Maker of Sea Pak.
1283	Manufacturer of celluloid eyelets for tennis shoes.
1284	Address of C. R. Co.
1285	Manufacturer of Champion rubber bathing shoe.
1286	Manufacturers of cements suitable for attaching rubber tiles and flooring to concrete and wooden floors.
1287	Manufacturer of toy golf balls.
1288	Manufacturer or sales agent of a mold wash called Volkies Compound.

The Rubber Industry in America

OHIO

The Goodyear Tire & Rubber Co., Akron, O., on July 7 resumed work in all departments after its shutdown for the annual inventory. Paul W. Litchfield, Goodyear president, on a recent trip to England, which included visits to various Goodyear operations abroad, conferred with Dr. Hugo Eckener and others in furtherance of plans for an early start on the regular trans-Atlantic Zeppelin service. Mr. Litchfield on July 15, the occasion of his thirtieth anniversary with the organization, announced his gift to the Goodyear Relief Association of $30,000 to be used in relief work among needy cases of Goodyear employes during the next five years.

On July 16 Vice President C. C. Slusser announced the complete personnel of the new Goodyear tire factory at Buenos Aires, Argentina. Ross A. White, managing director of Goodyear-Argentina since 1916, will be managing director in charge of sales. Fred Climer, general superintendent, will have a strong organization. Robert E. Lee, Jr., assistant superintendent, will also be superintendent of Division B. Kay Green will be the other division superintendent in charge of Division A. Ernest C. Gagnon will manage the development department; while Laurence H. Coffin will be manager of tech service and tire design. H. A. Delaney will take charge of purchasing and storerooms. G. C. Powell will head factory accounting. He is now in Argentina as are C. R. Bollinger, treasurer, and E. J. Kroeger, chief engineer. Personnel manager will be Frank J. Carter. George Jenks will have charge of tires, and R. L. "Scotty" Hunter will be master mechanic. W. G. Miller will have charge of tubes. Robert P. Steele, Thomas M. Reavis, and Mac C. Carter will be foremen in Division A.

Roland J. Blair and Frank A. Trotter, piloting the "Goodyear-Zeppelin" in the National Balloon Race from Houston, Tex., July 4, landed their balloon two and a half miles northwest of Greensburg, Ky., at 6 p. m., July 6, winning the race with a sensational 785-mile flight.

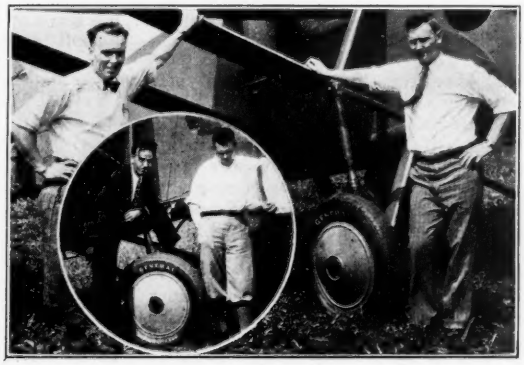
Rubber Division, A. C. S., Meeting

The fall meeting of the Rubber Division, A. C. S., will be held in Cincinnati, O., during the week of September 8. There will be two half-day sessions, the first on Wednesday morning, September 10, and the second on Thursday morning, the 11th. Headquarters will be at the Gibson Hotel, which will be also the headquarters of the A. C. S.

The banquet committee consisting of Walter Juve and Harold Gray with C. W. Sanderson, chairman, is planning for one of the best banquets and entertainments ever held at a Rubber Division meeting.

New Goodrich Inner Tube

THE B. F. Goodrich Co., Akron, O., recently offered a new type of inner tube known as the Air Container. Its construction is as follows: A tube of proper size is covered with a ply of 9-ounce cord fabric as wide as the tread surface of the tire. A specially shaped strip of puncture sealing rubber is put on top of the fabric. The tube is cured and turned inside out. This reversal compresses the special rubber strip under the patented cord insert, which, being cut on the bias, makes for even more powerful compression. When punctured, the compression member firmly grips the puncturing object and so prevents air from escaping.



The Hunter brothers, who set a new world record for a refueling endurance flight above Chicago Airport in July, had both Stinson-Detroiter planes equipped with airplane tires of the General Tire & Rubber Co., Akron O. the tires on the refueling plane meeting the severer test. The tires functioned perfectly throughout the long, grueling grind.

In the illustration, John Hunter, one of the pilots of the record-breaking "City of Chicago," is shown at the left, with one of his mechanics at the right. In the insert, Wilson T. Herren, backer of the flight, is at the right, beside the refueling plane, "Big Ben."

Ervin C. Pope, production manager for the Cleveland Liner & Manufacturing Co., 5508 Maurice Ave., Cleveland, O., announces the arrival on July 15 of a baby girl.

H. W. Maxson, organizer and general manager of Air Services, Inc., Akron, O., airport, resigned to become manager of a newly created department of public relations and aeronautic promotion at The B. F. Goodrich Co., Akron. R. F. Kitchingman, chief pilot for Air Services, Inc., for the last year, will succeed Mr. Maxson as general manager, the change becoming effective on August 1.

The Seiberling Rubber Co., Akron, O., according to President F. A. Seiberling, will not shut down even temporarily to take inventory.

"We're going right along, and things are going to be better," Mr. Seiberling declared.

Employes had anticipated cessation of operations for at least two weeks. Similar shutdowns had already occurred at other rubber plants, but the Seiberling management found business sufficiently brisk to justify continuous operation as the year 1930 swung into the beginning of the last half.

The Firestone Tire & Rubber Co., Akron, O., now works on a four-day-week schedule, producing about 40,000 tires daily as against a plant capacity of about 60,000 daily. The manufacturing program calls for heavy liquidation of inventories, which at present have reached a seasonal peak, valued about $47,000,000. This will be reduced below the figure of October 31 last, $41,000,000. The company has ceased practically all expansion work and will not extend its chain of 300 retail units for the time being. Nor are the Liberian rubber plantations, the development of which has been written off, being extended under existing crude rubber market conditions. The company will not close for inventory during the present season but will continue indefinitely at about the current schedules.

The Mohawk Rubber Co., Akron, O., after a special meeting of the directors on June 30 announced several changes. J. F. Jones, vice president in charge of sales and a director, resigned, and George W. Spahr, formerly sales manager of the Dayton Rubber Manufacturing Co., Dayton, O., has been named to the office. Mr. Jones' place on the board of directors has been filled by the election of Dr. R. H. Bishop, formerly on the board of The Goodyear Tire & Rubber Co., Akron. H. H. McCloskey, secretary also resigned, and offices of secretary and treasurer were combined, with Ray E. Bloch, vice president in charge of finance, holding both positions.

Leon T. Noel was elected assistant secretary, a new post, and H. H. Matz was renamed assistant treasurer. The Mohawk board of directors now consists of S. S. Miller, chairman, Charles Borland, president of the company, Dr. R. H. Bishop, W. L. Flory, and J. B. Huber.

The Parsons & Parsons Co., 2176 E. 76th St., Cleveland, O., manufactures several brands of waterproof collars and cuffs.

The Cooper Corp., Findlay, O., under contract has purchased all the assets of the Falls Rubber Co., Cuyahoga Falls, O. The latter company will use the sums realized to pay current liabilities and first mortgage Series A notes. The Falls company has the option to repurchase all mold equipment and all machinery from the Cooper Corp., especially for the sale and manufacture of Falls tires. The distinctive names for tires and tubes used by the Falls company will be retained.

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

Number	Commodity	City and Country
*45,980	Brewers' hose	Mexico City, Mexico
*†46,008	Truck tires	Liverpool, England
*46,009	Cloth	Hamburg, Germany
†46,013	Conveyer belting and technical goods	Brno, Czechoslovakia
†46,016	Tires and tubes	Ciudad Obregon, Mexico
†46,046	Canvas shoes	Hamburg, Germany
†46,057	Scrap rubber	Hamburg, Germany
†46,066	Overshoes	Hamburg, Germany
*46,074	Overshoes and boots	Milan, Italy
*46,075	Scrap and reclaimed rubber	Shanghai, China
‡46,094	Gutta percha in sticks	Hamburg, Germany
†46,113	Shoes	Amsterdam, Netherlands
*†46,164	Tire repair outfits	Calais, France
†46,165	Heels	Alexandria, Egypt
*†46,166	Tires	Wad Medani, Sudan, Egypt
*†46,187	Tires	Khartoum, Sudan, Egypt
†46,229	Bathing caps, balloons, games, toys, etc.	Paris, France
*46,267	Hot water bottles	Stockport, England
*†46,298	Tennis shoes and balls	Mukden, China
*†46,300	Gloves	Montreal, Canada
*46,317	Belting	Manchester, England
‡46,324	Boots	Hamburg, Germany
†46,360	Shoes and mechanical goods	Barranquilla, Colombia
*†46,368	Mechanical goods	Turin, Italy
*46,415	Sandals	The Hague, Netherlands
*†46,416	Belting	Turin, Italy
†46,429	Galoshes	Vienna, Austria
†46,434	Transmission belts	Prague, Czechoslovakia
†46,463	Dental rubber	Berlin, Germany
†46,464	Erasers	Lugano, Switzerland
†46,475	Rubber goods	Rome, Italy
*46,484	Tires and tubes	Lublin, Poland
†46,518	Gymnastic shoes and overshoes	Hamburg, Germany
†46,521	Toys	Caguas, Porto Rico
†46,531	Rubberized fabrics	Paris, France
*46,544	Waste and old rubber	Hamburg, Germany
*46,565	Heels	Amoy, China
‡46,566	Toys	Harburg-Wilhelmsburg, Germany
†46,567	Tennis and rubber shoes	Milan, Italy
*†46,609	Bathing caps	Medan, Sumatra
*†46,610	Boots and shoes	Milan, Italy
‡46,617	Footwear	Harburg-Wilhelmsburg, Germany

* Purchase. † Agency. *† Purchase and agency. ‡ Either.

EASTERN AND SOUTHERN

Martin Rubber Co., Inc., manufacturer of mechanical rubber goods, 327 Jackson Ave., Long Island City, N. Y., at a recent meeting of the board of directors elected Walter L. Tepper president to take the place of Dr. Martin Tepper, who resigned to become chairman of the board. The new president, for the past few years general manager of the company, is a graduate of New York University and has also taken courses in industrial engineering at Columbia University.

United Tire Stores Corp. of America, 11 E. 44th St., New York, N. Y., has advanced Thomas Lane from treasurer to first vice president, and Louis A. Brown has been elected secretary-treasurer. The board of directors has been reduced from ten to seven members, and the executive committee of the board from five to three members. The corporation will participate in the annual convention of the National Tire Dealers Association to take place in Chicago, Ill., in November. Distribution of Mercury tires and tubes, sponsored by the corporation, now is nationwide.

Sweets Laboratories, Inc., 423 W. 127th St., New York, N. Y., makes synthetic chicle in special grades for several trades including mechanical rubber and cable insulation, and it also makes modified chicle for chewing gum. The officers are Franklin V. Canning, president; John O. Barker, secretary; and Dr. H. V. Dunham, consulting chemist.

The Society of Automotive Engineers, 29 W. 39th St., New York, N. Y., has appointed John A. C. Warner secretary and general manager to succeed the late Coker F. Clarkson. It has also created the post of assistant general manager, to be filled by C. B. Veal.

D. F. Cranor, of the Binney & Smith Co., New York, N. Y., recently returned to New York after an extended visit to the carbon black producing fields in Louisiana and the Texas Panhandle. The continually increasing importance of operations in the Panhandle district has necessitated expansion of the control laboratories located near Pampa, Tex.; and Mr. Cranor has, of late, devoted much time to this phase of the company's activities.

The Harshaw Chemical Co., Cleveland, O., recently completed a new warehouse and office building at Philadelphia, Pa. This new construction together with the alteration of existing buildings increases the warehouse facilities by more than 100 per cent, giving a total of 39,000 square feet. Sales and branch office activities are housed in the second floor of the new building. Quarters previously occupied by these offices have been altered to house factory offices and the new laboratory, which functions chiefly in plant control but carries on some experimental work as well.

Julius Muehlstein, secretary-treasurer of Muehlstein & Co., Inc., 41 E. 42nd St., New York, N. Y., dealer in crude and scrap rubber, returned on July 21 after an extended trip to Europe.

T. F. Dunn, Jr., of Wishnick-Tumpeer, Inc., 251 Front St., New York, N. Y., recently completed a business trip to England and the Continent, in the interests of Wishnick-Tumpeer, Inc., and the companies owned and operated by this firm, Century Carbon Co. and The Pioneer Asphalt Co. Agents and customers in England, France, Germany, Holland, Czechoslovakia, Austria, Italy, Spain, and Scandinavia were visited by Mr. Dunn.

Latrobe Rubber Co., Latrobe, Pa, manufactures rubber packers, bumpers, cord, and stripping cut by special machines from old solid tire stock.

S. H. Renton, of the Vulcanized Rubber Co., Morrisville, Pa., is spending several weeks of his vacation traveling through the West.

Pennsylvania Rubber Co., Jeannette, Pa., through W. O. Rutherford, president, in return for successes scored in developing greater business volume during the first half of the year, has promoted five sales officials. L. J. Waldron, sales manager in the New York zone, has been given jurisdiction over the New England and Philadelphia territories. A. Koehler, trade sales manager in the factory zone, is now in charge of the Chicago, Dallas, Detroit, and Kansas City territories. J. Frank Moore, sales promotion manager, has been named assistant sales manager and in supervision of export, bicycle tire, and tennis ball sales, also branches in Atlanta, Cincinnati, Memphis, and Jacksonville. H. H. Boucher, Los Angeles district manager, is head of all Pacific Coast activities. John C. Rutherford, formerly in charge of dealer cooperation, has been made advertising manager.

McClaren Rubber Co., Charlotte, N. C., subsidiary of the Ajax Rubber Co., Racine, Wis., through Charles R. Collins, McClaren official, announced that the Ajax plant at Racine will be moved to the Charlotte plant where both Ajax and McClaren tires will be manufactured in the future. The working force at the southern plant gradually will be increased until about 400 are employed, and the factory will operate three eight-hour shifts daily.

Lithopone, Litharge, and Sub-Lead

The following tonnages of lithopone, sublead, and litharge are reported by the Bureau of Mines as having been used in 1929 by the domestic rubber manufacturing industry:

	Tons	Percentage of Production
Lithopone	7,176	3.5
Sub-lead	655	3.9
Litharge	6,651	7.5

NEW JERSEY

Some branches of the New Jersey rubber industry were quite active during the past month, and this resulted in overtime work. One plant placed a night shift on automobile and swimming tubes, for the latter are in great demand. Production of rubber cloth, tiling, and brake lining has also increased. The hard rubber situation, however, has not shown much improvement; while plants manufacturing jar rings are beginning to slacken production. The output of hose and belting continues good.

Trenton rubber manufacturers having exhibits at the American Fair held July 17 to August 27 at the Atlantic City Auditorium, Atlantic City, are: Combination Rubber Co., Hamilton Rubber Co., Luzerne Rubber Co., Home Rubber Co., Joseph Stokes Rubber Co., Woven Steel Hose & Rubber Co., Murray Rubber Co., Essex Rubber Co., and the William R. Thropp Sons Co. Clifford H. Oakley, of the Essex company, Bruce Bedford, Luzerne president, and J. Edward Myers, of the Acme Rubber Co., compose the manufacturers' committee.

Hermann Weber, 43 Jackson St., Hoboken, dealer in crude rubber, gutta percha, balata, and crepe soling, recently has assumed the agency of Ferguson's hard rubber dust. This is produced from new hard rubber cured for conversion into dust. It is thus of guaranteed gravity and analysis and obtainable in any quality, quantity, or mesh desired.

J. Hauvette Michelin, president of the Michelin Tire Co., Milltown, offered bonus money of $700,000 to about 700 former employes of his plant. This money is the result of an accumulative yearly bonus paid employes under contract. Under the company's rules the bonus is not payable until three years after the employe severed connections with Michelin. Many requests for the money have been made, and Mr. Michelin decided to abide by the wishes of his former employes by releasing the money now. It was announced that the average amount due each employe is $1,000. Letters will be sent asking each former employe whether he wants the money now or to allow the funds to remain and draw 5 per cent interest. If the employe decides to wait, the money will be paid in three years with interest.

General C. Edward Murray, president of the Crescent Insulated Wire & Cable Co., Trenton, celebrated his sixty-seventh birthday on July 17. He was recently elected one of the board of managers of the Trenton Savings Fund Society.

Whitehead Brothers Rubber Co., Trenton, very busy in all the departments, has increased working hours to fill a number of large orders.

Dural Rubber Corp., Flemington, at present operates a night shift to keep up with orders. The company has doubled the production of its tube department because of the demand for both swimming and automobile tubes. An additional force of fifty will be employed. The company will erect a one-story addition to house part of the tube department. The other departments are also busy, and enough orders are on hand to keep the factory rushed until early fall.

The Standard Underground Cable Co., Perth Amboy, has let a contract for the construction of two buildings, 80 by 100 feet, two stories high, in Mechanics St., to be used for rubber mills.

The Pocono Rubber Cloth Co., Trenton, has employed new workers to keep up with orders. The concern is operating steadily five and a half days a week. Officials say that business for each month has improved over the preceding month and conditions are now on the upward trend.

A. B. Norwalk, for about a year the vice president in charge of sales for the Murray Rubber Co., Trenton, resigned on July 1 and returned to New York, N. Y. He was holding the position temporarily, and it is now filled by Alfred H. Branham. The Murray company now functions 80 per cent capacity and expects a large business for July and August.

The Essex Rubber Co., Trenton, reports that business is good and that it expects to be busy for the remainder of the summer. Clifford H. Oakley, Essex president, is a lover of the water and spends considerable of his spare time on his handsome yacht 'Querida." He is commodore of the Trenton Sea Scouts and frequently sails with the boys on the scout ship "Ballantrae."

Robert J. Stokes, president of the Thermoid Company, Trenton, was vacationing with his family along the Massachusetts coast.

The Joseph Stokes Rubber Co., Trenton, announces that business remains fair and that better conditions are expected during late summer.

Puritan Rubber Co., Trenton, states that business is very good and that prospects are bright for the remainder of the season. The company's business for June and July greatly exceeded that for the same period last year.

The Luzerne Rubber Co., Trenton, has experienced no increase in business during the past month. Bruce Bedford, president, Mrs. Bedford, and their two sons spent two weeks in Bermuda and are now at Bay Head, N. J.

U. S. Rubber Concentrates Mechanical Goods Division at Passaic

THE United States Rubber Co., New York, N. Y., through F. B. Davis, Jr., chairman of the board and president, has announced that, as an additional step in its move to concentrate its production in a few factories, it is well along on the consolidation of its important division for the manufacture of mechanical goods at its plant at Passaic, N. J. Manufacturing heretofore carried on in plants at Chicago, Ill., Cleveland, O., and Chelsea, Mass., is now in process of transfer to Passaic. The offices of the mechanical goods department, which have been located for many years at 1790 Broadway, New York, will be moved to Passaic as of August 1. A modern steel and concrete factory building has been erected at Passaic to provide additional manufacturing space. The Passaic plant will be the largest in the world devoted to the manufacture of mechanical rubber goods, and the new building is one of the finest structures ever erected in the rubber industry.

U. S. Rubber Mechanical Goods Plant, Passaic, N. J.

Walter Gussenhoven, general manager of the mechanical goods department, has announced the appointment of Arthur D. Kunze as assistant to the general manager. Mr. Kunze since 1929 was secretary of The Rubber Manufacturers' Association, New York, assistant secretary since 1923, and office manager since 1920. A native of Hastings-on-Hudson, N. Y., his first business experience was in a secretarial capacity with the N. Y. Central Railroad from 1915 to 1920.

NEW ENGLAND

The George P. Cox Last Co., established in 1812 in Malden, Mass., by George Cox and others, is to discontinue operations permanently. The plant, which made wooden, and later aluminum, lasts for rubber shoes and gaiters, usually employed a hundred workers, more recently fifty, and for the last few months about twenty-five. The closing of the Boston Rubber Shoe Co., also in Malden, last fall was a severe blow to the Cox business.

The Goodyear Rubber Co., Middletown, Conn., through President Harold S. Guy, stated that because of a large inventory, production at the plant is at its minimum. Large and many contracts have come in, but these can be filled from last year's production. Owing to this overproduction fifty-two employes have been laid off. Salesmen are on the road only six months of the year, and contracts secured by them will be filled during the summer months. A disappointing winter season, from the standpoint of the company, served to keep business down somewhat. No special lines are showing better sales than others. Business will probably remain quiet until the fall, Mr. Guy believes.

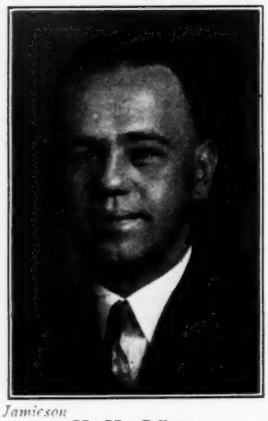
The Firestone Footwear Co., Hudson, Mass., closed its plant from July 3 to 21 for the annual vacation of its employes. During this time, however, necessary repairs will be made in the various departments.

Massachusetts Tercentenary. In conjunction with the celebrations of the landing of the Puritans and the founding of Massachusetts Bay Colony in 1630, various local manufacturing companies, including the following, offer personally conducted tours through their plants: Boston Woven Hose & Rubber Co., Cambridge; Fisk Rubber Co., Chicopee Falls; Boston Insulated Wire & Cable Co., Dorchester; and the Woonsocket Rubber Co., Woonsocket, R. I.

Boston Shoe and Leather Fair. The eleventh annual shoe fair was held at the Hotel Statler, Boston, Mass., on July 7, 8, and 9, and rubber manufacturers closely allied with the boot and shoe industry were much in evidence. All of the rubber men present were of the opinion that trade was on the upgrade, not a splurge upward but a gradual increase all along the line. Practically all reported that orders obtained at the fair were very encouraging, much better than anticipated, considering the present period of unrest and curtailment.

The Stedfast Rubber Co., Boston, Mass., displayed among its products, for the shoe and novelty trade, Kafsted, Stedfast, a reenforcing material, Suedsted, sock lining, backing cloth, Vamsted doubler and shoe cover cloth. The Goodyear Tire & Rubber Co., Akron, O., had a booth for meeting the trade, but no display. The Essex Rubber Co., Trenton, N. J., exhibited an array of sport soles, emphasizing those in color. The United States Rubber Co., New York, N. Y., showed the goods of its fiber products department, LaFlex products, including mid-soles, counters, box toes, heel bases, cutting blocks, and beam presses, as well as rubber soles in colors, for sport shoes. The Alfred Hale Rubber Co., Atlantic, Mass., featured new styles in beach sandals and sport shoes. The Dewey & Almy Chemical Co., Cambridge, Mass., showed Darex soles and heels; while the Avon Sole Co., Avon, Mass., displayed Du-Flex soles and heels.

H. H. Offutt has been appointed to the technical staff of Godfrey L. Cabot, Inc., 940 Old South Building, Boston,



Jamieson

H. H. Offutt

Mass. From 1919 to 1928 Mr. Offutt was with the Pennsylvania Rubber Co. as works chemist, research compounder, and chief chemist. Early in 1929 he was employed by the B. F. Goodrich Co. for tire development compounding work, particularly tread compounding. In his new position he will assist in the Cabot plan for producing better carbon blacks and closer control of variations in the behavior of black in rubber.

George R. Keltie, general manager of the American Wringer Co., Woonsocket, R. I., was elected president of the Woonsocket Chamber of Commerce at the annual luncheon of the board of directors last month.

The United States Rubber Co.'s Valley St. plant held its annual outing, June 28, at Rocky Point, on Narragansett Bay, about 1,000 persons attending. The day's program included a shore dinner, field sports and athletic games, swimming contests, and a bathing beauty contest. The baseball team representing the Sundries Department defeated the Hard Rubber Factory team, 4 to 1.

The National India Rubber Co.'s accounting department held its third annual clambake and outing at the Leahy Farm in Bristol on July 12. In addition to the chowder served at noon and the bake later in the afternoon an interesting program of field sports and athletic games was run off for suitable prizes in each event.

The United States Rubber Co. vigorously is pursuing its program of concentrating manufacturing activities in a few large units to effect a radical reduction in costs. Steps in this program thus far have been the consolidation of manufacturing and sales activities of the tire department at Detroit, Mich., of the mechanical goods division at Passaic, N. J., of the miscellaneous products department at Providence, R. I., and of the clothing department at Cambridge, Mass. Final decision on footwear division activities has yet to be made. Already the Candee, Malden, Melrose, Beacon Falls, and Cambridge, Mass., plants have been closed, leaving available Williamsport, Woonsocket, Bristol, and Naugatuck, of which the last named is probably the most modern and efficient. Some further concentration of footwear making activities is probable before the year is out, with the following already under way. Both the Millville, Mass., and the Naugatuck, Conn., plants of the Woonsocket Rubber Co., footwear division of the U. S. company, closed for the annual vacation on July 12 to reopen on August 4 with a curtailed force to run out stock and complete orders on hand. Permanent closing of these two plants, however, will take place no later than October 1. Production requirements will be taken over by Goodyear's Metallic Rubber Shoe Co., Naugatuck, another subsidiary. Two additional closings included the Revere Rubber Co., Chelsea, Mass., last month, and the American Rubber Co. factory at East Cambridge, Mass., on July 19. The equipment of the Revere company was moved to Providence. By the end of the year the United States Rubber Co. will have not over thirty active plants in this country and Canada, a reduction of over 40 per cent since the du-Pont-controlled management took hold of affairs in 1928.

Announcement was made recently of the appointment of John A. Horner as New England district manager of tire sales for the United States Rubber Co. During the past nineteen years Mr. Horner has held executive positions in the tire industry at Pittsburgh, Pa., Baltimore, Md., Fort Wayne, Ind., and Richmond, Va.

The Ward & Andre Co., 43 Howard St., Brockton, Mass., has announced that its entire stock is now owned by B. Milo and Wm. D. Burke, both of Brockton, formerly part owners of the company with Joseph M. and E. Louise Andre.

The Fisk Rubber Co., Chicopee Falls, Mass., which had a week's shutdown, partly to take annual inventory and partly because of the slump in the tire industry, is now operating again on a four-day week schedule, as before the shutdown. Numerous changes have taken place within the plant recently, with a cutting program in effect. Department heads have been let go, and in two departments nearly all the workers have been forced to seek new positions. The doctor and the dentist at the plant were let out, and the editor of the Fisk magazine was relieved of his position.

PACIFIC COAST

Firestone Tire & Rubber Co. of California reports production steadily creeping up at its Los Angeles, Calif., factory, the output for the past month being quite as much as for the boom month of July last year, and the prospect excellent for further increase. Further use is being steadily made of facilities afforded in the large additions to the original works, and the management believes that before the end of the year the entire new wings will be fully utilized. July visitors included Russell A. Firestone, vice president of the California company, and J. W. Thomas, executive vice president of the parent Firestone company in Akron, O. They had first made a tour through the Northwest and, having visited all the Firestone branches on the Pacific Coast, went to Los Angeles for a week. Both expressed themselves as agreeably surprised at the fine condition of the plant in the Southwest and at the fine prospects for trade.

Vice President and General Sales Manager R. C. Tucker of the California company has been confined to his home for several weeks with a stomach ailment, but is reported improving. George M. Kryder, manager of truck and bus tire sales at Akron, has been making a tour of the Pacific Coast field with H. D. Tompkins, who has a similar position with the southwest Firestone concern.

Pacific Goodrich Rubber Co., Los Angeles, Calif., finds business steadily improving in the eleven farwestern states and the trans-Pacific field covered by the company. Incidentally production of tires and tubes is being stepped up from week to week. Advertising Manager E. T. Morris returned in mid-July from a trip to the eastern states and at Akron, O., conferred with executives of the parent Goodrich company. Auditor F. C. Cory was called to New York state by the illness of his father.

Four additional stores, in Los Angeles, Sacramento, Seattle, and Tacoma, in July were put in the chain of 42 operated by Goodrich Silvertown, Inc., on the Pacific Coast. E. W. Show is general manager of the Pacific Division; M. D. Judkins, operating manager; and R. M. Dulin, merchandising manager. The zone managers are: E. E. Turnbull, Southern California, Arizona, and Texas; J. W. Loughlan, Los Angeles group; R. J. Loomis, Colorado; H. W. Gregory, Washington and Oregon; and T. C. Fry, Northern California.

Thermoid Company, Trenton, N. J., finds business particularly good on the Pacific Coast, according to Coast Manager Willard Kelly, with headquarters at 1263 Mission St., San Francisco, Calif. The products marketed include brake linings, radiator hose, universal joint disks, clutch facings, belting, hose, packing, and tubing. It is stated the company's sales show an increase for every month this year over the same months last year. This is attributed to the aggressive and enthusiastic spirit of the entire sales organization as also to the possession of a strong and complete line of brake linings. Two more salesmen have recently been added to the force.

James N. Kirk, sales manager, World-Bestos Corp., Paterson, N. J., has been visiting leaders in the rubber and asbestos trade on the Pacific Coast.

Douglas Radford, president of the West American Rubber Co., Los Angeles, Calif., spent most of July on a business trip in the mid-continent oil fields.

Samson Tire & Rubber Corp., Los Angeles, Calif., for several months on a 24-hour daily schedule, is likely, it is stated, to continue operations on that basis for a long time yet because of the considerable pressure of orders for tires and tubes from large distributers, as well as on its own account to supply its numerous exclusive dealers in various parts of the country. It is stated that additions are being made steadily to the latter list. While the main or production part of the new plant has been in operation many months, with an equipment said to be unsurpassed, finishing the executive offices has not been hurried. However, the final touches on these in the 6-story building on the main highway are now being made, and the officials expect to move into the new quarters about the middle of August.

Griffith Rubber Mills, Portland, Ore., specializing in recovering press rolls used in paper manufacturing, notes an improvement in business due to the recent increase in the installation of paper making machines in the Northwest. Besides doing considerable roll replacement and overhauling, the company also manufactures a porous rubber top press roll for original equipment, patented by C. R. Griffith, which is attached to metal cores sent to the mills by eastern machinery manufacturers. Business in this special product is also said to be improving. General mechanical goods and rubber-faced non-slip pulleys likewise are said to be in better demand.

Goodyear Tire & Rubber Co., Los Angeles, Calif., reports business on the uptrend, sales comparing well with the high mark for last summer. All departments are on full time, and in some two shifts daily are required. The stimulation to sales occasioned by the price reductions in June is said to have a marked cumulative effect, which, it is believed, will last well into the fall.

California Sports Co., 6325 Wilmington St., Los Angeles, Calif., is one of the rubber concerns much benefited by the setting up of miniature golf courses on the Pacific Coast. The company, of which C. L. Patterson, president of the Patterson-Ballagh Corp., is the head, is pioneering in the manufacture of golf balls and has installed considerable expensive machinery. It specializes in the novelty of branding golf balls with the names and monograms of numerous owners or the titles of such courses, and the demand is so heavy that the factory is doing much overtime. Ed. C. Huyck, who had been developing the plant, left early in July, and the active management has devolved on J. E. Walker, also chief engineer of the Patterson-Ballagh Corp.

Ever Ready Rubber Products Co., Twelfth and Howard Sts., San Francisco, Calif., of which M. E. Dorman is president, manufacturing rubberized garments, toilet specialties, pure gum goods, shower curtains, etc., recently installed considerable machinery in its enlarged plant. Sales are much larger than a year ago, and production pressure necessitated abolishing the usual vacation shutdown for the first two weeks of July. Mr. Dorman recently supplied the United States Navy Department with a quantity of double texture rubberized fabric, made to specifications, which will be used experimentally in aviators' suits, the cloth being made at a factory in Brooklyn, N. Y., in which Mr. Dorman holds a large interest.

Eno Rubber Corp., Los Angeles, Calif., reports business as unusually good, with an excellent prospect of continuing so for the remainder of the year. Its plant in Torrance, Calif., is running practically at capacity on oil field supplies, plumbers' and general mechanical rubber goods, and many patented specialties, among them inflatable "O-so-Soft" cushions of various types, which are finding extensive sale in this and foreign countries. A line very lately developed is rubber accessories for miniature golf courses, for which a lively sale exists. Roy R. Musser is president; Chas. N. Merralls, vice president; and J. Carl Lobdell, secretary and treasurer.

Feather-Like Pneumatic Products Co., 5911 S. Broadway, Los Angeles, Calif., according to Arthur A. Leltic, owner and manager, has so far had the best year in its career. It manufactures a wide variety of inflatable pillows, cushions, mattresses, life preservers, balloon specialties, etc., which are distributed by sporting goods stores on this coast. A large order recently received was for rubber-cushioning the seats of the 248 airplanes for which a contract was given lately by the United States government to the Douglas Aircraft Co., Santa Monica, Calif.

Hewitt Gutta Percha Rubber Corp., Buffalo, N. Y., which three months ago opened a factory branch with the Marshall-Newell Supply Co., Spear and Mission Sts., San Francisco, Calif., is steadily extending the sales of its mechanical rubber goods and looks forward to exceptionally good business later in the year, according to its special representative, Charles K. Everett.

Patterson-Ballagh Corp., 1900 W. 65th St., Los Angeles, Calif., manufacturing various rubber specialties for the oil fields, has finished the large addition to its factory, and is said now to have one of the most up-to-date general rubber factories of its size in the country. Herbert N. Wayne, inventor and veteran

rubber expert, is superintendent of compounding. E. S. Dulin was recently elected vice president, succeeding Robert Schurman, resigned.

Angelus Heel & Rubber Co., 1417 N. Main St., Los Angeles, Calif., which had been confining its products to tire repair stock and general mechanicals, recently resumed the making of heels.

David W. Spence, vice president and chief chemist of American Rubber Producers, Inc., a subsidiary of the Continental Rubber Co., New York, N. Y., who has recently been spending much time at the company's guayule development station at Salinas, Calif., is scheduled to give an address on guayule at the fall meeting of the Los Angeles Group, Rubber Division, A. C. S., which is planning for a joint session with the Southern California Section, A. C. S.

A statement attributed to the California Commissioner of Corporation's office that the Sirco Products Co., 1036 S. Alvardo St., Los Angeles, Calif., had been formed to manufacture safety electrical products is said by Frank W. Hudson, named as vice president, to be premature. He states that he alone holds the concern's U. S. Patent No. 1,724,592, and that arrangements are being made for incorporation on a basis different from that reported.

Jarvis McCrea, of Binney & Smith Co., New York, N. Y., has been visiting the Midwest, including Denver, Colo., and more recently, the Pacific Coast, accompanied by W. J. Hoyt, of Martin, Hoyt & Milne, local representatives of Binney & Smith Co. Mr. McCrea spent some time in Los Angeles and San Francisco, Calif., and is now returning by way of the Canadian Rockies and Montreal, Canada. Mrs. McCrea accompanied him throughout the greater part of his trip.

A New Tire Core

THE new Super-Giant, 10.50-20 collapsible core, shown in the accompanying illustration, is unique in that the collapsing chuck or mechanism is adapted to operate on any size of core. The core is made of steel, being light-weight and practically indestructible.

The Giant tire, heretofore a minor part of tire manufacturing, has now developed into one of the most important departments, and it effects the commercial rather than the pleasure field, which is more substantial and more profitable. Old methods

India Super-Giant Core

of construction of these large tires are rapidly giving way to the new quick collapsible cores. The India Machine & Rubber Mold Co., Akron, O.

DENVER RUBBER MANUFACTURER'S RAPID RISE

TO have within a dozen years developed a small rubber business with a capital of but $3,500 into one with a capital of $3,000,000 and sales of $6,000,000 annually is an achievement of which any industrial leader might well be proud. Such success can be credited to Charles G. Gates, president of the Gates Rubber Co., Denver, Colo., who before he had become a rubber manufacturer had been a noted mining engineer in the region of the Rockies.

Blank & Stoller, Inc.

C. G. Gates

If asked what factors have most contributed to such striking expansion of the modest venture of twelve years ago, Mr. Gates will lay emphasis on three: the constant application of true engineering principles to manufacturing, an unremitting effort to better product quality, and the aid of a loyal and competent production and merchandising personnel.

Mr. Gates began in 1912 in an 18 by 100 feet store as a maker of leather tire covers or protectors, with halters as a side line. Within a few years (1918) he was making rubber tires instead and also fan belts, radiator hose, and mechanical rubber goods. Soon his brother, John C. Gates, joined him, and now the two own 98 per cent of the stock. Meanwhile the Gates factory has become one of the most modern in the country with a floor area of 475,000 square feet.

Born in Waterford, Oakland Co., Mich., on November 26, 1877, Mr. Gates was educated in the high school of his native town, Detroit Business University, mechanical engineering department of the University of Michigan, and the mining engineering department of the Michigan College of Mines. He graduated from the latter in September, 1903, with the degrees of B.S. and E.M.

From 1901 to 1903 Mr. Gates had been a field engineer with the American Bridge Co.; 1903-1905, engaged in metallurgical construction, Denver, Colo.; 1906-1909, did mineral exploration and field engineering in Nevada and Arizona; 1910-1911, was consulting engineer in Denver; and in 1912 incorporated the Colorado Tire & Leather Co., which in 1918 became The Gates Rubber Co.

Mr. Gates is a member of the Honorary Engineering Fraternity, Tau Beta Phi, of Masonic orders, including Shriners (El Jebel), Motor and Equipment Association, and the Rubber Manufacturers' Association. His business address is the office of the rubber company bearing his name, 999 S. Broadway, Denver, and his home is in the mountains, "Château Gates," Evergreen, Colo.

C. P. DeLore, of the C. P. DeLore Co., St. Louis, Mo., manufacturer of barytes, was painfully injured on July 16 when thrown from his horse. Mr. DeLore, resting comfortably in St. Mary's Hospital, is expected to return home within a few days.

RUBBER FOAM (CAOUTCHOUC MOUSSE) is now being used in crash-pads in airplane construction.

MIDWEST

American Zinc, Lead & Smelting Co., St. Louis, Ill., through Howard I. Young, president, has announced that Thornton Emmons, formerly assistant manager of sales, has been elected vice president, in charge of sales. He will continue to maintain his headquarters at the office of the American Zinc Sales Co., Columbus, O.

Inland Rubber Co., Chicago, Ill., reports business improving steadily. In addition to increasing demands by its own branches and direct distributers, it recently has had a large increase in orders, which will keep it very busy for the remainder of the year. According to Secretary C. P. Turner, the production schedule for the next two quarters will be considerably higher than for the two previous quarters. M. J. Flynn, formerly city treasurer of Chicago, has been elected president and treasurer to succeed George T. Gilman.

S. A. E. Chicago Meeting

Coincident with the air races during the last week of August in Chicago, six technical sessions of the Society of Automotive Engineers will be held mornings and evenings on August 26, 27, and 28 at the Palmer House. Thursday evening, August 28, will be devoted to an aircraft banquet.

CANADA

Two of the chief primary products used in mechanical rubber goods have shown declines in basic markets. Cotton for some time has followed a declining market, still weak in tone. Crude rubber is fluctuating, and some reductions have been noted recently. Although the rubber goods market is easier because of the declines, no change has yet been made in prices, old discounts still holding.

It is reported, however, that rubber goods manufacturers are considering making some changes in prices to adjust the 2 per cent now being deducted from net invoice figures because of the 1929 and 1930 reductions that were made in sales tax.

Manufacturers believe garden hose sales will exceed those for 1929. At this time last year they could not supply the demand as stocks were sold out, but the sale in 1930 so far has been very active, and they are in a position to take care of the business. Steady prices prevail, no changes having been made since the first of the season.

Although the monthly imports of raw materials may vary for many reasons, in the main they are a fair index of the state of the industry consuming the importations. It is therefore worth noting that May imports of raw rubber into Canada were 5,809,139 pounds, as compared with 5,158,781 pounds the month before and 6,579,299 pounds in May, 1929.

Production and sales of automobile tires thus far this year have been much smaller than in 1929. The outlook for the last half of the year is not considered any too bright. Some time ago it was believed that replacements would offset the decrease in buying new equipment by automobile makers, but it is now stated that replacement sales will probably be approximately the same as last year.

Letters from Our Readers

Information About Dipex

TO THE EDITOR:

Dear Sir: In a mold spraying solution published in your June issue Dipex was given as an ingredient. What is it, and where can it be obtained?

July 6, 1930. MOLD ROOM FOREMAN.

Dipex is the trade name for water soluble sodium sulphonate, which is recommended as a mold wash. The amount to be used depends on how heavy a solution is required. In general 6 to 8 ounces are dissolved in a gallon of water, and this solution is brushed over the surface of the hot mold cavity. The only disadvantage is that Dipex is dark in color and may have a tendency to stain white rubber surfaces. It is supplied by Stanco Distributors, Inc., 2 Park Ave., New York, N. Y.

THE EDITOR.

W. E. Wing and **F. W. Kramer,** the former general sales manager, and the latter factory manager of the Northern Rubber Co., Ltd., Guelph, Ont., recently visited the firm's branch at Saint John, N. B., where they were met by W. R. Stewart, Maritime representative of the company. Moncton, N. B., also was visited.

Gutta Percha & Rubber, Ltd., in Robert's three-story building at Calgary, Alta., recently suffered fire damage resulting in a complete loss of stock.

Dominion Rubber Co., Ltd., Montreal, P. Q., manufacturing rubber floating toys, bathing caps, Fleet Foot athletic footwear, and numerous other products, is enjoying good business in various departments, while in the tire department activity is prevalent.

Canadian Goodrich Co., Ltd., Kitchener, Ont. President James D. Tew has announced that a major part of the export business of The B. F. Goodrich Rubber Co. will be transferred from the company's international plant in New York, N. Y., U. S. A., to Kitchener. Mr. Tew paid a brief visit to the Kitchener factory early in July and conferred with D. L. Sargeant, manager of the Canadian plant. While the details of the proposed transfer were not disclosed, Mr. Tew indicated that a further announcement would soon be made. He predicted a great revival in the industry would occur within a short time and that by bringing to Canada the Goodrich company's large export business, both the company and Canadian workmen would benefit.

Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont. In a letter accompanying current dividend checks President and General Manager C. H. Carlisle says the nine-month operations of the Goodyear fiscal year should be considered satisfactory when compared with available business. So that shareholders may form a more accurate opinion of the value of their stock, Mr. Carlisle gives approximate figures indicating that in the nine-month period $400,000 has been added to reserve for depreciation; current assets equal $10,250,000; gross fixed assets, $12,000;080; and surplus, over $8,000,000.

The cotton mill at St. Hyacinthe, P. Q., is now in full production, operating 22 hours per day.

In the future the standard Goodyear flap equipment for all 32 by 6 Standards will be the rubber flap. Previously this had been standard equipment only in 32 by 6 Heavy Duty and larger truck and bus tires.

General Dry Batteries of Canada, Ltd., has leased space at 1244 Dufferin St., Toronto, Ont. The company, which took over the battery business of the Dominion Battery Co., Toronto, is setting up its own plant fully equipped with the latest automatic machinery of its own design for manufacturing under its many Canadian patents, cells and batteries for all purposes. The president is Cyril P. Deiber, president also of the parent company, General Dry Batteries, Inc., Cleveland, O., U. S. A. H. J. Rich, of Toronto, is assistant managing director, in charge locally.

Trafalgar Rubber Co., Ltd., Toronto, Ont., has opened a branch office at 14 Prince Arthur St., E., Montreal, P. Q., where it carries stock for the convenience of shoe manufacturers and repairers.

Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., is featuring its new Firestone heavy duty, gum-dipped balloon tire in large advertisements in Canadian newspapers.

R. I. Raycroft, of the Firestone organization, states that truck operators and manufacturers, realizing the trend toward balloon tire equipment, have been quick to take advantage of the truck and bus balloon tire, and this year will find many of the leading truck companies introducing truck type balloons on the front wheels of their new 1930 models, as well as offering them as optional dual equipment for rear wheels.

Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., has introduced two new golf balls: the Dunlop Maxfli Spotkwick and the new large-size lighter ball which is the proposed U. S. G. A. standard for 1931. This ball is 1.68-inch in diameter, and it is expected that it will become very popular this year. The Dunlop line also includes Warwick balls: the Warwick and the Warwick Floater.

Obituary

An English Rubber Engineer

AT the age of 47, on June 24, Wallace Bridge died at a nursing home at Taunton, England. He had been a director and had charge of the foundry of David Bridge & Co., Ltd., Castleton, with which firm he had devoted his entire business career. He was also the youngest brother of the late Robert Bridge, whose activities in connection with rubber machinery were so well known. Wallace Bridge, a prominent Mason, was past provincial treasurer of East Lancashire. Interment took place at St. Martin's Church, Castleton, on June 27.

Robert Rhoades

ROBERT RHOADES, 41, for sixteen years head of the separator department of the Joseph Stokes Rubber Co., Trenton, N. J., died on June 30 from heart trouble. He was stricken while at work and passed away a short time later at the McKinley Hospital. He was a native of Philadelphia, where burial was made. A daughter survives him.

Stephen J. Keating

STEPHEN J. KEATING, 39, assistant district manager of The Goodyear Tire & Rubber Co., at Philadelphia, Pa., died at his home in Oak Lane on July 21 after a heart attack induced by acute indigestion. He was unmarried.

Technical Communications

Practical Tests on Blue Ray Paint

IT IS a matter of common knowledge among rubber manufacturers that exposure of uncured compounded rubber to sunlight greatly reduces its tacky quality and thus impairs its workability in the manufacture of goods. Cured rubber articles also dry out and surface crack when long exposed to the sun.

The most obvious remedy for preventing these effects is to exclude the sun wholly or partially from the rubber.

In this connection it is worth noting that a non-actinic paint has been perfected for use on the windows of rubber factories, and its value demonstrated by the following comparative tests:

Test No. 1. Two uncured tire skim stocks were exposed to bright midsummer sunlight for three hours in wooden boxes with one side only allowing light to pass. There were three different conditions of exposure as tabulated below. After exposure the adhesion of the exposed surfaces to an unexposed surface of the same stock was tested with the following results:

Condition of Exposure	Adhesion after Exposure Skim "A"	Skim "B"
(a) Direct exposure. No glass	None	Very poor
(b) Through untreated window glass	Poor	Poor
(c) Through window glass painted with Blue Ray	Good	Good

Test No. 2. Press-cured slabs of cured tread stock bent double were exposed under the same conditions as above for one month, with the following results:

(a) Direct exposure	Very deep cracks
(b) Untreated glass	Deep cracks
(c) Glass painted with Blue Ray	Small checks

Test No. 3. An inner tube stock was exposed under a stretch of 16.66 per cent for four winter months. Tensile and elongation were taken before and after exposure with the following results:

Condition of Exposure	Per Cent Deterioration Tensile	Elongation
(a) Direct exposure	22.1	10.8
(b) Untreated glass	20.5	8.2
(c) Glass painted with Blue Ray	4.4	1.5

From the foregoing results it will be seen that the special paint gives pronounced protection to rubber against sunlight both during the manufacturing process and in store rooms. Data from the R. T. Vanderbilt Co., New York, N. Y.

Rubber Dispersed Colors

INORGANIC colors such as iron oxide and ultramarine blue have been used for coloring rubber since the early days of the industry, but recently a demand has developed for the more brilliant shades that are obtainable only by the use of organic colors. When this demand first arose, rubber manufacturers naturally turned to the insoluble pigment lakes and toners which had been developed primarily for printing inks and for coloring paper, linoleum, etc. Colors of this class are made by treating dyestuffs with precipitating agents, thus rendering them insoluble in water. They are only partially satisfactory for rubber goods because they do not disperse readily in rubber. Fine grinding alone does not insure good dispersion because most organic colors have a tendency to "pack" on the rolls and may agglomerate during the mixing process, regardless of how finely they may be ground. Of even greater importance is the fact that the sulphur and vat dyes are not adapted to the production of lakes and toners; yet these newer types of dyes have the greatest fastness to light and heat and are chemically the most inert.

These problems appear to have been overcome through the development of the so-called "rubber dispersed colors," which are concentrated colloidal dispersions of organic colors in high grade plantation rubber. The process for making these colors, which was developed by one of the most prominent color manufacturers, has made possible the use in rubber of vat dyes and other highly complex organic colors that are not suitable for use as dry colors. Dipped goods such as toy balloons made by the use of these colors have a smooth and shiny surface which cannot be duplicated by the use of dry colors. The reason for this is that it is impossible completely to disperse dry colors in rubber, and when a toy balloon is inflated, particles of undispersed color cause microscopic irregularities in the surface of the balloon, thus detracting from its shininess.

Although rubber dispersed colors are but a recent development, they are already being used in hundreds of different rubber products. The most important use from the point of view of tonnage is in automobile inner tubes, but a host of other rubber products have been improved through the use of these newly developed dyestuffs. Data from E. I. du Pont de Nemours & Co., Wilmington, Del.

Sponge Paste

SPONGE paste both as a material and as a method is a radical departure from old methods of making sponge rubber. As a material it combines the necessary ingredients for most types of sponge in correct amounts including softener, blowing agents, accelerators, and antioxidant. In method it reduces the prolonged milling usually associated with sponge production so that many users report savings of 30 to 50 per cent in power costs on milling alone. Plasticity needed is produced by the paste chemically rather than by mechanical means. Because of this major activity of this material, the manufacture of sponge rubber has been very much simplified.

This new material and method has been received with as much enthusiasm by experienced sponge manufacturers as by those who are very new in this field. The uniformity of the results obtained is apparently the quality that the veteran seems to like. By the most recent developments it is now possible to produce sponge rubber with a volume fully five and a half times its original thickness by relatively simple procedure. This alone should open up immense new fields for sponge rubber never heretofore touched, such as the manufacture of upholstery and mattresses. Data from The C. P. Hall Co., Akron, O.

Zenith Reclaim in Tires and Tubes

OUTSTANDING physical properties have been attained in the reclaim used in the following typical tire tread and inner tube mixings. On its own cure this reclaim shows breaking tensile above 2,400 pounds per square inch and ultimate elongation of 650 per cent. In the formulae given the reclaim shows critical and outstanding quality as evidenced by the consistent tests of physical properties obtained under the respective cures.

TIRE TREAD FORMULA

Smoked sheet rubber	35
Zenith reclaim	35
Carbon black	20
Stearic acid	2
Zinc oxide	5
Sulphur	1.75
Captax	0.50
Age Rite powder	0.75
	100.00

Specific gravity 1.212.

Press Cured at 40 Lbs. Min.	Breaking Tests—Tensile Lbs.	Elongation %	Modulus at 500% Lbs.
25	3,740	600	1,454
35	3,557	537	1,703
45	3,517	525	1,753
55	3,495	503	1,772

INNER TUBE FORMULA

Smoked sheet rubber	50
Zenith	50
Stearic acid	2
Zinc oxide	5
Sulphur	2.25
Captax	0.25
Age Rite powder	1.00
	110.50

Specific gravity 1.10.

Press Cured at 40 Lbs. Min.	Breaking Tests—Tensile Lbs.	Elongation %	Modulus at 500% Lbs.
10	2,453	770	742
15	2,741	737	913
20	3,127	733	1,146
25	3,026	710	1,167

Data from U. S. Rubber Reclaiming Co., Inc., New York, N. Y.

Soft Carbons

THE declining price of rubber has, naturally, raised the question of volume cost of compounding in general. The use of lower gravity pigments at moderate prices has effected enormous economies because their volume cost was so much lower than that of crude rubber. As this situation changed, the present volume cost of crude rubber is approximately 10 cents per pound volume unit—the lowest in history. Even at this level, however, it will be found that pigments such as Fumonex and Velvetex work out at approximately 7 cents per volume unit; which is still a saving of 30 per cent over the cost of rubber.

(*Continued on page* 112)

The Rubber Industry in Europe

GREAT BRITAIN

The Question of Restriction

Details of the British-Dutch Liaison Committee's meeting, held on June 26 in London, have not been disclosed, the Rubber Growers' Association merely issuing a statement that complete agreement had been reached on certain recommendations, which would be submitted to their respective associations. It has been suggested that the British representatives were in favor of renewing compulsory restriction and that the details were not published so they would not reach New York before Mincing Lane opened.

However, it is to be remarked that many authorities have advised the introduction of compulsory restriction. Thus, the *Financial Times* learns that a well-known firm of rubber brokers considers that with such low prices the prospects of cooperation among rubber growers are much stronger. It is thought inconceivable that full production will be continued under existing conditions, and it is held that restriction is bound to come, either through voluntary agreement or by force of circumstances.

At a meeting of the Bukit Rajah Co., the chairman, Sir Edward Rosling, said that with the United States in its present state of economic depression no sudden increase in consumption would appear likely. The only alternative from the producer's point of view would be either to sit still hoping that the other fellow will either reduce or cease his production, or an organized system of restriction which would have to be government controlled and include all the chief producing countries.

Personally he thought they should agitate for the latter. A month's holiday among European producers was only playing with the question and was economically unsound. Every form of restriction must be likewise if it does not permit the reduction of an estate's labor force.

W. Arthur Addinsell, chairman of the Rubber Estates of Krian, said at a meeting of the company that the Stevenson Scheme was sound in principle, and that apart from the question of protecting British interests, the Malayan governing bodies would be compelled to take action in protection of the local community if existing conditions continued much longer, and nothing saner or fairer could be proposed than the reintroduction of compulsory control of output.

On the assumption that organized producers were definitely in favor of restrictive measures, J. G. Hays, chairman of the United Sua Betong Rubber Estates, suggested that for a definite period producers should limit outputs to 75 per cent of 1929 production. Although such a policy involved risks, no ideal course exists, but rather a choice of evils, and this scheme would involve a minimum of interference with estate practice.

Messrs. Faulkner and Winsor point out that in some quarters it is asserted that the present British Government will never agree to supervise regulation of supply. It is thought that while Labor's policy is not inherently antagonistic to government interference with industry, the fanatic adherence to old liberal trade dogmas by one important member of the present administration is pointed to as an insurmountable obstacle to introducing any officially supported restriction plan. However, it remains to be seen whether if the two governments actually be approached, they will take the responsibility of refusing to cooperate to save an industry in which £800,000,000 British and Dutch capital have been invested and from which home and colonial governments have drawn and may yet draw large amounts of revenue.

In the meantime it is quite evident that the less favorably situated companies are beginning to feel the pinch of the times in earnest. Lately the directors of the Sekong Rubber Co. have proposed that the estate be closed down and all operations cease for the time being. The average all-in cost of this concern for the past six years has been 12.97 pence per pound. At present the company has £13,000 in liquid assets and is operating at a loss of about £400 a month. It is, therefore, proposed that the remaining funds be kept intact as far as possible and the estate closed down.

The appointment of a receiver for the Bodde Rubber Estates is contemplated. As a result of the continued depression in the rubber market the funds of the company are now exhausted. On April 23 and May 8 shareholders were asked to make advances to the company of at least £5,000 in order to carry on operations for about a year, but a quite inadequate response from the shareholders resulted; hence the need for a receiver. The loss on the year's trading was £3,947, against a loss of £5,427 in 1928 and a profit of £4,367 in 1927.

Institution of the Rubber Industry

The following program of papers to be read during the 1930-31 session has been received from the Institution of the Rubber Industry.

London and District Section. To be read at the Arts Theater Club, Great Newport St., W. C. 2. October 6. "The Desirable Properties of Synthetic Compositions for Industrial Purposes," W. D. Owen. November 3. "The Attachment of Hard and Soft Rubber to Metal," G. G. Cole. December 1. Paper by A. Van Rossem. January 5. "Solvent Recovery." Author not yet decided upon. February 2. "A Review of the Contributions of X-Ray to Rubber," C. W. Shacklock. March 2. Short Papers Night. April 6. "Vibration of Buildings and the Possibility of Rubber as a Useful Shock Absorber," H. C. Young.

Popular Lecture. F. W. Burstall, vice principal and professor of mechanical engineering, Birmingham University, will address the Institution on "The Future of Industrialism."

Manchester Section. To be read at the Manchester, Ltd., Royal Exchange, Manchester. October 23. "Some Aspects of Standardization," B. D. Porritt. November 20. "The Evaluation of Raw Rubber," G. Martin. December 18. "The Use of Concentrated Latex in the Rubber Industry," J. H. Carrington. January 22. "A Comparison of English and American Technique over the Last Decade," E. H. Wallace. February 6. At the Engineers' Club, Manchester, a conjoint meeting with other societies. I. "Plant Used in the Manufacture of Synthetic Resins," A Fraser. II. Paper by the British Dyestuffs Corp. March 19. "Some Problems in Sponge Rubber Manufacture," S. A. Brazier.

Midland Section. October 14. To be read at the Grand Hotel, Birmingham: "Patents in the Rubber Industry," A. V. Dwyer. November 11. Grand Hotel, Birmingham: "Wheels and Rims as Applied to Transportation," J. Wright. November 25. To be read in Wolverhampton: "The Elimination and the Utilization of Waste," C. P. Hawkins. December 9. Grand Hotel, Birmingham: "Standardization as Applied to Rims and Tires," W. Bond. January 13. Grand Hotel, Birmingham: "The World's Rubber Supplies," G. Rae. February 10. At the Grand Hotel, Leicester: "The Manufacture and Use of Rubber Goods in the Far East," S. G. Ball. March 10. Grand Hotel, Birmingham: Paper by W. T. Tyson. Joint meeting with the Institution of Automobile Engineers: "Tires from the Motor Manufacturers' Standpoint," C. R. F. Engelbach.

West of England Section. October 1. To be read at Trowbridge: "Rubber in the Sports' Industry," J. W. C. Ferrebe and F. L. White. November 5. at Melksham: "Some Notes on Rubber Factory Layout," W. Cliffe. December 3. At Trowbridge: "Rubber Works' Accountancy and Costing," C. Solomon.

Colwyn Gold Medal

The conditions for the Colwyn Gold Medal award for 1930 have just been published. The essay which in the opinion of the I. R. I. Council is considered best and which is submitted by a member of the rubber industry (of British nationality, but not necessarily a member of the Institution) will receive the medal. No restriction as to age exists.

The subject of the essay will be "The Advantages, Disadvantages, and Possibili-

ties of Rubber as a Constructional Material for Transport Purposes Generally." The essay should not exceed 5,000 words and must be accompanied by a brief summary of not more than 200 words. The work must be submitted under a *nom de plume*, the actual name and address of the author being enclosed in a sealed envelope addressed to the I. R. I. Secretary. The identity of each author will be treated as strictly private and confidential until permission of the author has been obtained to publish his or her name. To be considered at all, essays must reach the offices of the Institution of the Rubber Industry, Faraday House, 19 Charing Cross Road, London W. C., not later than October 1, 1930. However essays from overseas may be received up to October 21, 1930.

Rubber in New Device Prevents Wheel Wobbling

The *India Rubber Journal* publishes a description of an invention by W. L. Adams which, it is claimed, prevents wheel wobble and removes noises and shocks on the steering gear. The device consists of a casting bolted to the front axle, in which is fastened a block of rubber that is compressed both horizontally and vertically. The center of this block is molded with teeth to correspond with a gear wheel type pin, to which a lever is fixed. This lever is connected to the track rod by a drag link which is bolted on when the wheels are in dead straight line with the rear wheels and the lever in a neutral position.

The same idea is adaptable for the rudders of water craft, airplanes, motorcycles, bicycles, or any engineering device which has an angular movement that must positively return to a neutral point.

Herbert Wright Honored

In recognition of his services to the Imperial College of Science and Technology, South Kensington, Herbert Wright has been knighted and will be known as Sir Herbert Wright.

A director in a number of planting companies in the East, he was recently elected vice chairman of the Rubber Growers' Association. His connection with the rubber growing industry dates back to the early days of plantation rubber. From 1900 to 1903 he was scientific adviser to the director of the Royal Botanic Gardens, Peradeniya, Ceylon, and from 1903 to 1907, controller of the experimental station at Peradeniya, and soon became known as an authority on plantation rubber. He is the author of "Hevea Brasiliensis or Para Rubber: Its Botany, Cultivation, Chemistry, and Diseases," "Rubber Cultivation in the British Empire," and "Science of Para Rubber Cultivation." In 1907 he came to London and associated himself with rubber journalism and with the Rubber Estate Agency; at this time he also became editor of the *India Rubber Journal*, a position which he held for over a decade.

GERMANY

Scientific Conferences

Three scientific societies held general annual meetings at Frankfurt a. Main during the period of June 10 to June 17, inclusive.

German Rubber Association

From June 15 to June 17, inclusive, the Deutsche Kautschuk Gesellschaft met for its fourth annual meeting. An interesting program had been prepared for the large number of participants, including well-known chemists from England, France, Holland, Italy, and the United States. In all nineteen papers were presented, which will be published in full in *Kautschuk* and will find mention in the "Bibliography" columns of INDIA RUBBER WORLD as they appear. Papers were read by the following American rubber scientists: A. A. Somerville, New York, N. Y., "Some New Developments in the Physical Testing of Rubber"; A. H. Smith, now of London, England, "The Trend of Rubber Research in America"; E. Grenquist, Chicopee Falls, Mass., "Relation Between Dispersion and Physical Properties of Carbon Black Compounds"; E. P. Kearsley, Chicopee Falls, Mass., "The Development and Standardization of the Testing of Rubber with Ozone."

Kolloid Association

On June 10 and 11 the Kolloid Gesellschaft held its eighth general meeting when an unusually large number of interested persons attended. Among the papers presented were: "Space Conception of the Structure of Carbon Combinations and Their Application in the Chemistry of High Polymers," by K. H. Meyer; "Organic Chemistry and Colloid Chemistry," by H. Staudinger; "High-Polymeric Substances in Dispersed Condition," by H. Mark; "Kinetic Processes in the Deformation of High Molecular Combinations," by R. O. Herzog; "The Constitution of Rubber," by R. Pummerer; "Micromanipulations of Latex in Dark Field," by E. A. Hauser; "Thermodynamics of Lycophile Colloids," by H. Kroepelin; and "Measurements of Rubber Solutions," by P. Stamberger and C. M. Blow.

Society of German Chemists

Finally, the Society of German Chemists held its forty-third general meeting from June 10 to 15. Papers of interest to rubber men included "Relation Between Viscosity and Molecular Weight in High Molecular Substances," by H. Fikentscher and H. Mark, and "Methods of Determining the Constitution of High Molecular Combinations," by H. Staudinger.

The Achema VI

The Achema VI took place in Frankfurt a. Main from June 10 to 22 and was held in connection with the forty-third general meeting of the Society of German Chemists. Only four rubber firms were represented: Franz Clouth, Koln-Nippes; Darex A.G., Frankfurt a. Main, in connection with the Metallgesellschaft; New York-Hamburger Gummiwaaren Co. and associated Dr. H. Traun u. Sohne; Ungarische Gummiwarenfabriks-A.G., Budapest. Werner & Pfleiderer, Cannstatt, showed a few machines for the rubber industry.

Hanseatische Gummiwerke

The American rubber manufacturing firm, I. B. Kleinert Rubber Co., Inc., New York, N. Y., U. S. A., has acquired the greater part of the shares of the Hanseatische Gummiwerke G.m.b.H., Hamburg. It is understood that the manufacturing program of the German concern is to be extended; the management will continue as before under Willy Wolf and Richard Levy, both of Hamburg.

FRANCE

Referring to an earlier discussion in *Le Caoutchouc et la Gutta Percha* on the disadvantages of certain rubber jar rings, A. D. Luttringer remarks in the June 15 issue of that periodical that for some time past good results have been obtained by using guttas and balatas in the composition of the mixes from which these rings are manufactured. The guttas and balatas employed for this purpose should give a semi-fluid resin when extracted; this insures good keeping qualities in these materials.

Before incorporating them in the mixes the guttas and balatas should be specially washed and dried. To facilitate this incorporation it is necessary to roll them out in sheets as thin as possible. Because of their well-known plastic properties the guttas give very satisfactory results for the purpose in question.

RUSSIA

The *Financial Times* learns that the Trade Commissariat of Moscow has instructed its organization to buy about 2,000,000 rubles' worth of rubber. Purchases are to be made partly in cash and partly on credit, and a similar amount of rubber is to be bought next year. As the *India Rubber Journal* points out, the above amount will buy about 3,300 tons of rubber at the prevailing prices; whereas according to the Rubber Growers' Association, the Russian rubber imports last year came to 12,700 tons, indicating a severe drop in Russian consumption, and it would be interesting to learn the reason for this heavy decline.

Incidentally, attention may be called to an item in the June issue of *Kunststoffe*, where it is stated that Soviet-Russian products are of inferior quality and that the Trade Commissariat has received numerous complaints from consumers and trade organizations. Up to the present, it seems the demand for goods was such that consumers were only too glad to get any kind of goods. In pre-war days, Russian rubber footwear in general could be expected to give eight to nine months' service, but now these goods do not last longer than four to five months. In the Leningrad factory of the Resino Trust only 15 per cent of the goods produced could be considered perfect; whereas in the Moscow factory of the same trust, the percentage of first quality goods came to 40 per cent.

The Rubber Industry in the Far East

MALAYA

Compulsory Restriction Urged

The price of rubber is now so low that only 10 per cent of the Malayan estates are working at a profit, and even that number is on the decrease. The May tapping holiday has had no other effect than to plunge the industry still further in the doldrums so that now the majority of producers are working at a loss, except, of course, those who are fortunate enough still to have profitable forward contracts to fill. Under the circumstances it is not surprising that there is renewed agitation in some quarters for compulsory restriction of output. Is mere restriction of output the right solution of the problem? Looking back on the comparatively high prices that prevailed when the Stevenson Plan was in operation, many protest that with all its faults restriction was a fine thing for the industry, forgetting that had it not been for this measure, which stimulated subterfuge of every kind, the world would not now be overwhelmed with an unsuspected plethora of rubber. The situation with regard to the acreage under rubber, for instance, would have been clearer and producers would not now have to lament the fact that in counting on an area under rubber of 4,750,000 acres, they had been living in a fool's paradise since the actual area is now accepted as 6,000,000 acres, while one authority has even stated that it is nearer 7,000,000 acres.

Unauthorized Planting

To what extent the unwarranted high prices of the restriction period were responsible in Malaya for unauthorized planting of rubber can only be guessed. At the annual meeting of the Johore Planters' Association recently held, a member pointed out that land was often obtained by Chinese on a large scale for the ostensible purpose of cultivating pineapples. That commodity was cultivated but made its appearance between lines of rubber.

In the annual report of Kelantan for 1929 we come across these significant passages:

"The unauthorized planting and interplanting of rubber in past years on land not alienated for this purpose makes it difficult to give accurate figures for this area actually under rubber, more especially as with the fall in the value of the crop, considerable areas of young rubber have been abandoned and allowed to revert to secondary jungle; but the available figures give a total planted area of 89,213 acres of which 50,695 are mature."

And further on: "With the estates on alternate day systems of tapping and some of the small holders not tapping regularly because of the low price, production was approximately 360 pounds per acre, but a rise in price would stimulate production by at least 25 per cent, and the large areas planted in 1926 and 1927 (20,000 acres) will in another three years greatly increase the potential production figure."

Rationalization Suggested

Restriction is questioned because it creates a false sense of security while giving opportunities for secret dealings and unsuspected and unexpected developments. Also, it does not go to the root of the situation which is that there are too many companies in existence that are overcapitalized, poorly managed, lacking in funds, and low yielders. It is the excess production that helps to glut the market and the panic selling of these companies that helps to depress prices. Moreover in schemes to right the industry it is the high costs of production of the weaker estates that force the setting up of an unduly high price level as standard, which tends to stimulate new plantings, generally where it is least desired, thus perpetuating a vicious circle.

What the plantation industry needs is rationalization, which would postulate the elimination as far as possible of poor yielding and high cost estates, and the reorganization of estates having good possibilities but hampered by financial disability.

It so happens that in the *Straits Times* suggestions have appeared which might very well be embodied in a scheme of rationalization. For instance one writer urges the resting of trees during the wintering season as a permanent measure:

"This resting of trees . . . is no temporary measure to reduce output, but a permanent step to lengthen the life of the trees and reduce the cost of production. When this is recognized and adopted, the whole year's work will be arranged, and consequently there will be no labor difficulties. . . . .

"It will be a most convenient time to give leave. It is a dry season and will lend itself admirably to repairing roads, clearing ditches, mending fences, painting and repair of buildings, etc. It should be the time of general overhauling and the putting of everything in first class order for the coming tapping season. . . . .

"Supposing that resting were fairly generally adopted in 1931, it would undoubtedly reduce the output but not to the full extent of the resting period. Part would be recovered during the tapping season. In about three years' time . . . when the trees had fully recovered from being tapped at the wrong season, the yield will undoubtedly be heavier than if they had not been rested as and when nature ordains they should be."

Another writer finds that only two things must be done: to increase the yield and cut the cost and at the same time control output and sales to consumers. In his scheme every effort would be made to increase productivity in all areas; exhausted areas would be rested; those where soil and trees were too far gone would have to be thrown out permanently as not worth spending more money on. Considerable areas in the country, he points out, can never repay the cost of replanting.

He offers a suggestion which, if followed, would go a long way toward helping the industry, if only because of the revelations that would result; that trees should be classified according to yield per acre. Thus A class estates would be those producing over 500 pounds per acre, with a small class A1 producing over 600 pounds per acre (without budded material), B class producing 400 to 500 pounds, C class producing 330 to 400 pounds, and D class producing under 330 pounds per acre. The price to be aimed at should be about 10 pence per pound, which would be high enough to insure a reasonable profit to the average well-run estate, while at the same time it would discourage indiscriminate planting.

Finally there is the resolution of the Johore Planters' Association regarding the question of giving tappers outside work. This has become insistent owing to the practice recently introduced of giving tappers shorter tasks with the idea of having all tapping done in the early morning hours, by which means the output has been found to increase. But this lets the tapper off too early, hence the necessity for outside work.

The point is not so simple as it would appear to be to the layman because the tapping coolie in Malaya regards it beneath him to do anything else but tapping. However, at the meeting in question it was proposed to approach the Malaya Planters' Association to have it try to induce the country as a whole to take steps to get tapping coolies to do outside work in addition to tapping. If this move meets with success, a further reduction in costs could be looked for.

Rubber Propaganda

Some time ago the Government came in for much criticism in connection with its retention of what was known as the Hypothetical Fund. This fund consisted of money that had accumulated from the export tax on rubber which in accordance with the agreement made when the Stevenson Plan was introduced, was intended to be used to forward the interests of the industry by research and propaganda.

It is now learned that the F. M. S. Government intends to appropriate $2,500,-

000 (Straits currency) from the special reserve fund mentioned above. A special board will be created, representative of the industry, to receive applications and to make recommendations.

Decision of Liaison Committee

The *Financial Times* learns on good authority that the British-Dutch Rubber Liaison Committee has come to a final agreement regarding an immediate policy to be pursued. At a meeting held in Holland July 7, it was unanimously decided, it is understood, to restrict production by 25 per cent and to fix the pivotal price at 9 pence.

It was further agreed that members would submit to their respective governments' recommendations that pressure should be brought to bear upon the native producers to induce them to conform to the proposed restriction of rubber production.

It is interesting to learn in this connection that Sir Cecil Clementi, the Governor of the Straits Settlements and High Commissioner for the F. M. S., will pay an official visit to Mr. de Graass, the Governor General of the Dutch East Indies, at Batavia at the end of August. It is assumed that on this occasion the rubber question and particularly the question of native rubber will be discussed. Up to the present the Dutch East Indian Government has repeatedly shown itself averse to interfering in an official capacity in the matter of private enterprise; nevertheless, it is hoped that joint regulation of the Dutch East Indian policy may be devised by which the necessary government assistance can be given to a far-reaching scheme of control of the European and native rubber output.

NETHERLANDS EAST INDIES

Hevea Selection

A very interesting review of the present status of Hevea selection in East Java was given by J. C. s'Jacob at a meeting of the Coffee and Rubber Circle, Besoeki.

Before proceeding with the actual discussion, the lecturer stressed the fact that all data submitted must be regarded as temporary and that, therefore, no definite conclusions could be drawn.

Budgrafting in East Java has not yet reached the development found in West Java or in East Coast Sumatra and as far as production figures of the local PR clones are concerned, practically the only material available is that from the experimental budgrafting areas in Moemboel. The oldest tapping on budgrafts here dates back to October, 1927. The garden was planted in February-March, 1923, and partly in February, 1924. The dry years experienced since 1925 have retarded the development of the trees; in addition coffee is interplanted with the rubber. Altogether the budgrafts here have developed under far less favorable conditions than in West Java so that it is hardly surprising to learn that the outputs are not nearly so high as those of the well-known West Java clones.

Dr. s'Jacob also found in analyzing the figures that there were so extremely few high-yielding clones; whereas all PR clones are descended from carefully selected mother trees. Clone PR45, for instance, is an unusually poor yielder, giving an average of 1 gr. per tree per tapping; even those trees of the same clone that are planted on better soil do not give more than 2.9 gr. per tree per tapping as an average. Yet the mother tree was a very good yielder, having given an average of 64.1 gr. of rubber over six years before it had to be destroyed in 1924 because of root disease. This clone is a very good instance of the surprises in store for those undertaking Hevea selection.

Judging Budgrafts

In selecting clones according to their yields, the speaker said that too little attention is paid to the local outputs of a given clone over a certain period of years and too much stress is laid on the clones which happen to be the highest yielders at a given moment. In 1923, for instance, 11 trees each of clones PR2 and PR5 were planted in adjoining rows. Now the first clone grows very rapidly; while the individual yields of the second are much higher. Nevertheless in the first two years the former produced more than twice the amount of the second although the same number of trees were planted to begin with.

Resistance to Disease

So far as can be judged from available data the East Java clones PR disclose no special susceptibility to disease. However, some trees of PR1 showed symptoms of a disease that resembled the effects of pink disease, although investigation failed to disclose the parasite responsible for this disease. The bark of the trees in question split and then died. When the disease spread, the affected branches died. At first the output was not influenced by this condition, but of late the production has ceased to increase. Oddly enough the disease has so far attacked no other tree except those of the clone mentioned. Further investigation showed that the mother tree of this clone had been killed by pink disease so that it is presumed that the clones inherited the peculiar disease from the mother tree.

Generative Selection

The most interesting work in this connection is that with artificial cross- and self-pollinations. So far none of the trees obtained from artificial cross-pollinations have yet reached the tapping stage, but five of the six trees from self-pollinated seed of PR7 and one from self-pollinated seed of PR2 are tappable. It is a remarkable fact that the rapid growth that characterized the budgrafts PR7 is also found in the PR7 seedlings. Results of tapping tests with the five PR7 trees for five months show good yields, equal to those from the best clones in the experimental garden; in fact, Nos. 1 and 2 gave yields that are superior to any the buddings have ever produced at the same age. Because the results of the first generation were so satisfactory, a large number of artificial self-pollinations were immediately carried out on all five trees. Part of these have been successful so that shortly legitimate seed of the second generation will be available —the first time that this type of seed has been obtained in Java.

Successor for Dr. de Vries

Dr. J. Gandrup has been appointed Director of the Rubber Experiment Station, Buitenzorg, Java, to succeed Dr. O. de Vries, who recently resigned.

Storing of Rubber

When rubber is stored, the market value always decreases because of external defects that arise during storage. In storing rubber the following precautions should be taken:

Sheets should be packed as soon as possible after they leave the smoke-house, sun-dried cases being used. Crepe may only be taken down on warm dry days, preferably during the hottest part of the day and must be sorted and packed on the same day to prevent the absorption of moisture from the air. If it happens that the work of sorting and packing cannot be completed on the same day, the remainder should be temporarily packed in boxes and closed with a loose cover.

Not more than 75 kg. of crepe and not more than 60 kg. of compo should be packed in a single case to prevent the rubber massing. The packed cases should be stored in a room where all cracks and openings should be sealed by pasting paper over them, and the cases covered with sacking at night to protect them from the night air, but this covering should be removed in the daytime.

In preparing sheet rubber for storing, the latex is diluted to 15 per cent dry content of rubber. If zinc coagulation tanks are available, the latex is coagulated with a solution of sodium silico-fluoride and formic acid, 8 gr. of the former being dissolved in 1 l. of water, after which 1 cc. of the latter is added. Of this solution, 100 cc. is added to a liter of 15 per cent latex.

For sheets, mouldex could be used to prevent the formation of mold, whether acetic acid, formic acid, or sodium silico-fluoride is used as coagulant. A five per cent solution of mouldex is made, of which 7.5 cc. are added to a liter of the 15 per cent latex before the coagulant has been mixed in. Mangled sheets must be rinsed in clean water for at least two hours.

In preparing crepe the latex concentration is lowered to 10 per cent, and sodium silico-fluoride only is used for coagulating, after sodium bisulphite has been added to the diluted latex in the usual manner. Eight gr. of sodium silico-fluoride are dissolved in 1 l. of water, and 62.5 cc. of the solution are added to 1 l. of 10 per cent latex.

Compo grades readily become tacky and are therefore hard to keep stored; but if necessary to store them, the only thing to be recommended is to soak them thoroughly for several hours in a 0.5 per cent solution of sodium bisulphite.

Rubber Patents, Trade Marks and Designs

Machinery

United States

1,761,011.* **Trimmer.** Its special function is to trim with rotary shears between the lining and the cuff portions of an overshoe. S. J. Finn, Beverly, Mass., assignor to United Shoe Machinery Corp., Paterson, N. J.

1,761,534.* **Treating Wiper Blades.** This invention provides a device for treating rubber wiper blades to provide an efficient wiping action on glass. This is done by causing a relative movement between a heated solid surface and the wiping edge of the blade held in contact with the hot surface provided in the machine. A. W. Phelps, assignor to Delco-Remy Corp., both of Anderson, Ind.

1,762,146.* **Tire Casing Former.** Centrifugal force is employed to effect the preliminary seal between the vacuum box and a pulley band in the shaping of a tire band into tire casing form. A. O. Abbott, Jr., assignor to Morgan & Wright, both of Detroit, Mich.

1,762,367 and 1,762,368.* **Extrusion Apparatus.** Crude or reclaimed rubber is strained in this device of special construction. Special support is provided for the outer end of the water cooled extruding screw extending through the strainer section. F. C. Vandergrift, Akron, O., assignor, by mesne assignments, to National-Erie Co., Erie, Pa.

1,763,106.* **Inner Tube Machine.** This provides a means for making unvulcanized tubing in continuous lengths, producing it rapidly from laminated calendered sheet with longitudinal hammered seams. C. E. Snyder, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,763,297.* **Bead Coverer.** Ring form tire beads for straight side tires are covered with fabric by this machine. The fabric is fed into contact with the outer perimeter of the core and is folded around the ring by three folding units. F. D. Fowler, Newton, Mass., assignor, by mesne assignments, to Hood Rubber Co., Inc., Wilmington, Del.

1,763,569.* **Fabric Treating Machine.** This relates to treating breaker strip employed in the construction of pneumatic tires particularly those produced by the flat built method. The effect of the treatment of fabric in this machine is to obtain a racking action which may be accurately controlled by the mechanism. The fabric is thus distorted to any desired degree. W. T. Van Orman, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,763,611.* **Tire Lining Machine.** A chuck mechanism is provided for supporting and rotating an unvulcanized tire while liquid lining material is applied to its interior surface. H. M. Brown, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,764,775.* **Thread Cutter.** This machine severs, cuts, or forms a rubber thread from cylindrical tubular stock at a high rate of speed. Old inner tubes are utilized as stock for thread cutting. F. W. Bommer, Everett, Mass.

1,765,184.* **Sheet Cutter.** By this device sheet rubber material can be severed in predetermined lengths. A rotary cutter is used adjustable to cut in desired uniform lengths sheets of various thicknesses. E. H. Trump, Akron, O.

1,760,411. **Bead Cutter.** W. E. Humphrey, assignor to Mason Tire & Rubber Corp., both of Kent, O.

1,760,719. **Tire Spreader.** J. A. Rekenthaler, Cushing, Iowa.

1,760,875. **Mandrel Handler.** T. P. Little, assignor to Fisk Rubber Co., both of Chicopee Falls, Mass.

1,760,879. **Tread Applier.** C. E. Maynard, Northampton, assignor to Fisk Rubber Co., Chicopee Falls, both in Mass.

1,760,880. **Tire Casing Expander.** T. Midgley, Hampden, assignor to Fisk Rubber Co., Chicopee Falls, both in Mass.

1,760,897. **Sectional Repair Bag.** C. H. Desautels, Springfield, assignor to Fisk Rubber Co., Chicopee Falls, both in Mass.

1,760,929. **Tire Building Machine Stitcher.** G. F. Wikle, Milwaukee, Wis., assignor to Fisk Rubber Co., Chicopee Falls, Mass.

1,760,944. **Tire Retreading Mold.** E. A. Glynn, assignor to Super Mold Co., both of Lodi, Calif.

1,761,687. **Tire Vulcanizer.** W. Schwalge, Elmhurst, Ill.

1,761,754. **Tube Splicer.** F. J. Shook, assignor to Semple-Lee Processes, Inc., both of Akron, O.

1,762,119. **Vulcanizer.** A. J. Fleiter, assignor to Akron Standard Mold Co., both of Akron, O.

1,762,131. **Watchcase Heater.** H. A. Denmire, assignor to General Tire & Rubber Co., both of Akron, O.

1,762,164. **Tester.** E. Eger, assignor to Morgan & Wright, both of Detroit, Mich.

1,762,227. **Tire Casing Expander.** G. W. Hebbeler, St. Louis, Mo.

1,762,453. **Tire Casing Machine.** J. E. Perrault, Watertown, and H. L. Davis, Walpole, both in Mass., assignors, by mesne assignments, to Hood Rubber Co., Inc., Wilmington, Del.

1,762,752. **Tire Machine.** A. O. Abbott, Jr., assignor to Morgan & Wright, both of Detroit, Mich.

1,762,822. **Feeder and Cutter.** H. J. Kroll, Wauwatosa, Wis., assignor to Fisk Rubber Co., Chicopee Falls, Mass.

1,762,824 and 1,762,825. **Tire Builder.** P. W. Lehman, Milwaukee, Wis., assignor to Fisk Rubber Co., Chicopee Falls, Mass.

1,762,826. **Stock Trimmer.** P. W. Lehman, Milwaukee, Wis., assignor to Fisk Rubber Co., Chicopee Falls, Mass.

1,762,828. **Cutter.** T. P. Little, assignor to Fisk Rubber Co., both of Chicopee Falls, Mass.

1,762,831. **Tube Splicing Mold.** C. E. Maynard, Northampton, assignor to Fisk Rubber Co., Chicopee Falls, both in Mass.

1,762,832. **Valve-Pad Press.** C. E. Maynard, Northampton, assignor to Fisk Rubber Co., Chicopee Falls, both in Mass.

1,762,833. **Tire Tread Guide.** C. E. Maynard, Northampton, assignor to Fisk Rubber Co., Chicopee Falls, both in Mass.

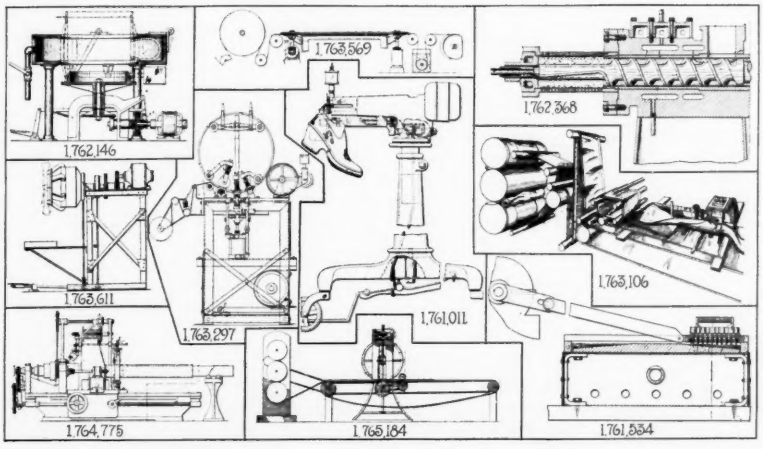
1,762,836. **Mold Breaker.** J. Scherner, Milwaukee, Wis., assignor to Fisk Rubber Co., Chicopee Falls, Mass.

1,762,839. **Tire Casing Builder.** H. L. Smith, Cudahy, Wis., assignor to Fisk Rubber Co., Chicopee Falls, Mass.

1,762,846. **Article Treating Device.** J. Waseluk, assignor to Morgan & Wright, both of Detroit, Mich.

1,762,849. **Tire Casing Machine.** G. F. Wikle, Milwaukee, Wis., assignor to

*Pictured in group illustration.



Fisk Rubber Co., Chicopee Falls, Mass.

1,762,850. **Tire Builder.** J. Vrbanac, Milwaukee, Wis., assignor to Fisk Rubber Co., Chicopee Falls, Mass.

1,762,856. **Turn-Under Stitcher.** C. H. Desautels, Springfield, assignor to Fisk Rubber Co., Chicopee Falls, both in Mass.

1,763,099. **Skiving Device.** G. J. Mead, Milwaukee, Wis., assignor to Fisk Rubber Co., Chicopee Falls, Mass.

1,763,136. **Extrusion Machine Insulating Head.** G. F. Crowley, Milford, Conn., and R. C. Pierce, assignors to National-Standard Co., both of Niles, Mich.

1,763,568. **Tire Trimmer.** E. G. Templeton, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,763,578. **Tube Deflater.** W. H. Campbell, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,763,583. **Sheet Feeding Control.** J. I. Haase, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,763,589. **Tire Former.** R. S. Kirk. assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,763,591. **Fabric Shaper.** E. F. Maas, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,763,592. **Band Builder.** E. F. Maas, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,763,594. **Fabric Tensioning Device.** M. C. Nelson, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,763,735. **Sheet Material Feeder.** H. H. Wydom, Boston, Mass., assignor, by mesne assignments, to Hood Rubber Co., Inc., Wilmington, Del.

1,763,801. **Fabric Laminating Device.** C. E. Maynard, Northampton, assignor to Fisk Rubber Co., Chicopee Falls, both in Mass.

1,763,809. **Conveyer.** H. J. Murphy, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,764,378. **Tire Retreading Mold.** H. J. Woock, Lodi, Calif., assignor, by mesne assignments, to Super Mold Corp., Reno, Nev.

Dominion of Canada

300,487. **Tire Retreader.** J. C. Heintz, Lakewood, O., U. S. A.

300,966. **Golf Ball Winder.** Dunlop Rubber Co., Ltd., London, N. W. 1. assignee of T. Cropper, Birmingham, Warwick Co., both in England.

United Kingdom

326,991. **Tire Flap Vulcanizer.** Dunlop Rubber Co., Ltd., London; H. Willshaw and T. Norcross, both of Fort Dunlop, Birmingham.

327,516. **Vulcanizer Door.** Dunlop Rubber Co., Ltd., London; H. Willshaw and W. G. Gorham, both of Fort Dunlop, Birmingham; J. Mills & Co., Ltd., and E. Ramsbottom, both of Heywood, Lancashire.

327,678. **Tennis Ball Revivifier.** W. Anderson, Blackhall, Midlothian. (T. S. Anderson, Grahamstown, South Africa.)

327,856. **Attaching Rubber to Metal.** Dunlop Rubber Co., Ltd., London; H. C. Young, Alderley Edge, and C. Hemm, of Dunlop Rubber Co. Works, Eccles, Lancashire.

Germany

Designs

1,122,513. **Sole Mold.** G. Ohlbrecht, Berlin-Lichtenberg.

1,123,557. **Skiving Device.** Dunlop Rubber Co., Ltd., London, England. Represented by R. and M. M. Wirth, C. Weihe, and H. Weil, all of Frankfurt a. M., and T. R. Koehnhorn, Berlin S. W. 11.

1,125,421. **Vulcanizing Apparatus.** Dunlop Rubber Co., Ltd., London, England. Represented by R. and M. M. Wirth, C. Weihe, and H. Weil, all of Frankfurt a. M., and T. R. Koehnhorn, Berlin S. W. 11.

1,125,765. **Glass Mold.** Thuringische Glas-Instrumenten-Fabrik Alt, Eberhardt & Jager A. G., Ilmenau i. Th.

1,126,188. **Sole Vulcanizer.** Firma Gust. Rafflenbeul, Schwelm i. W.

Process

United States

1,759,848. **Tire Casing.** J. Howard, Montreal, P. Q., Canada, assignor, by direct and mesne assignments, of three-eighths to S. Greenberg and one-eighth to W. Goodman and M. S. Wolfson, all of New York, N. Y.

1,762,165. **Surface-Finished Goods.** H. W. Emery, Holliston, assignor to Archer Rubber Co., Milford, both in Mass.

1,762,603. **Toy Balloon.** A. P. Witten, assignor to G. E. Hall and himself, both of Akron, O.

1,762,723. **Tire.** C. M. Manly, Richmond Hill, N. Y.; J. M., W. G., and B. M. Manly, executors of said C. M. Manly, deceased, assignors to Overman Cushion Tire Co., Inc., all of New York, N. Y.

1,762,830. **Tire Casing.** G. L. Mather, Milwaukee, Wis., assignor to Fisk Rubber Co., Chicopee Falls, Mass.

1,763,973. **Hose Manufacture.** V. Lefebure, Fulham, London, England.

Dominion of Canada

301,249. **Producing Rubber.** Rubber Electro Deposition Patents, Ltd., Holborn, London Co., assignee of S. O. Cowper-Coles, Sunbury-on-Thames, Middlesex Co., both in England.

United Kingdom

327,696. **Artificial Teeth.** J. V. Coogan, Limerick, Ireland.

Germany

500,862. **Packing Manufacture.** Beldam Packing & Rubber Co., Ltd., London, England. Represented by B. Kugelmann, Berlin S. W. 11.

500,941. **Producing Roll Covers.** C. H. Gray, London, England. Represented by F. Meffert and L. Sell, both of Berlin S. W. 68.

Chemical

United States

1,759,913. **Dispersions.** F. R. Moser, Bussum, Netherlands.

1,761,424. **Images on Rubber Surfaces.** J. P. Brockway, Coronado, Calif.

1,761,814. **Coating Rubber with Cellulosic Derivatives.** H. A. Bruson, Philadelphia, Pa., assignor to Resinous Products & Chemical Co., a corporation of Del.

1,762,152. **Dispersion.** A. Biddle, Trenton, N. J., assignor to United Products Corp. of America, a corporation of Del.

1,762,153. **Dispersion of Colloids.** A. Biddle, Trenton, N. J., assignor to United Products Corp. of America, a corporation of Del.

1,762,194. **Composition.** W. B. Pratt, Wellesley, Mass., assignor, by mesne assignments, to Dispersions Process Inc., Dover, Del.

1,762,494. **Treating Latex.** W. B. Wescott, assignor to Rubber Latex Research Corp., both of Boston, Mass.

1,762,531. **Accelerator.** W. Scott, Nitro, W. Va., assignor to Rubber Service Laboratories Co., Akron, O.

1,762,729. **Treating Latex.** J. McGavack, Jackson Heights, N. Y., assignor to Naugatuck Chemical Co., Naugatuck, Conn.

1,763,293. **Antioxidant.** H. W. Elley, assignor to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

1,763,325. **Accelerator.** D. H. Powers, Penns Grove, N. J., assignor to E. I. du Pont de Nemours & Co., Wilmington, Del.

1,763,579. **Antioxidant.** A. M. Clifford, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,763,615. **Age Resistor.** H. W. Elley, Wilmington, Del.

1,763,618. **Treated Liner.** L. B. Sebrell, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,763,619. **Method of Vulcanizing.** L. B. Sebrell, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,764,928. **Abrasive Composition.** A. Biddle, Trenton, N. J., assignor to United Products Corp. of America, a corporation of Del.

1,765,015. **Treating Latex.** E. Hopkinson, New York, and M. C. Teague, Elmhurst, both in N. Y., assignors to American Rubber Co., E. Cambridge, Mass.

1,765,134. **Sealing Composition.** B. Dewey, Cambridge, and E. C. Crocker, Belmont, both in Mass., Crocker assignor to Dewey.

Dominion of Canada

300,564. **Artificial Leather.** Dispersions Process, Inc., Dover, Del., assignee of T. G. Richards, Wayne, Pa., both in the U. S. A.

300,766. **Shoe Filler Composition.** Beckwith Box Toe, Ltd., Sherbrooke, P. Q., assignee of H. H. Beckwith, Brookline, Mass., U. S. A.

300,805. **Antioxidant.** Goodyear Tire & Rubber Co., assignee of J. Teppema, both of Akron, O., U. S. A.

300,806. **Accelerator.** Goodyear Tire & Rubber Co., assignee of J. Teppema, both of Akron, O., U. S. A.

300,807. **Antioxidant.** Goodyear Tire & Rubber Co., assignee of A. M. Clifford, both of Akron, O., U. S. A.

300,808. **Accelerator.** Goodyear Tire & Rubber Co., assignee of J. Teppema, both of Akron, O., U. S. A.

300,917. **Antioxidant.** H. A. Morton, Akron, O., U. S. A.

300,918. **Age Resisting Compositions.** H. A. Morton, Akron, O., U. S. A.

300,967. **Dispersed Rubber Manufactures.** Dunlop Rubber Co., Ltd., London, N. W. 1, assignee of G. W. Trobridge, Birmingham, both in England.

300,968. **Dispersed Rubber Manufactures.** Dunlop Rubber Co., Ltd., London, N. W. 1, assignee of D. F. Twiss, F. T. Purkis, and E. A. Murphy, all of Birmingham, all in England.

300,969. **Dispersed Rubber Manufactures.** Dunlop Rubber Co., Ltd., London, N. W. 1, assignee of W. H. Chapman and D. W. Pounder, both of Birmingham, all in England.

301,017. **Printing Ink.** Rucel, Ltd., London, E. C. 2, assignee of H. N. Morris, Manchester, both in England.

301,071. **Treating of Carbon Black.** W. B. Wiegand, Sound Beach, Conn., and L. J. Venuto, New York, N. Y., co-inventors, both in the U. S. A.

United Kingdom

326,782. **Dispersed Rubber Manufactures.** Dunlop Rubber Co., Ltd., London, W. H. Chapman and D. W. Pounder, both of Birmingham.

326,869. **Synthetic Rubber.** A. Carpmael, London. (I. G. Farbenindustrie A. G., Frankfort-on-Main, Germany.)

326,940. **Waterproofing Composition.** H. N. Morris, Manchester.

327,028. **Adhesive Composition.** Johnson & Johnson (Great Britain), Ltd., Slough.

327,094. **Linoxyn and Rubber Substitutes.** J. Y. Johnson, London. (I. G. Farbenindustrie A. G., Frankfort-on-Main, Germany.)

327,164. **Synthetic Rubber Thread.** J. Y. Johnson, London. (I. G. Farbenindustrie A. G., Frankfort-on-Main, Germany.)

327,447. **Animal Hair-Rubber Composition.** Kings Patent Agency, Ltd., London. (Bottcher & Renner, Nuremberg, Germany.)

327,451. **Treating Latex.** Dunlop Rubber Co., Ltd., London, E. A. Murphy and D. F. Twiss, both of Fort Dunlop, Birmingham.

327,452. **Latex Electrodeposition.** C. Macintosh & Co., Ltd., and H. C. Young, both of Manchester, and C. Hemm, Poynton, Cheshire.

327,513. **Rubber Composition.** J. Harris, Brighton-le-Sands, Australia.

327,691. **Waterproof Material.** A. A. Glidden, Watertown, and W. R. Hickler, Weston, both in Mass., U. S. A.

Germany

500,642. **Curing Rubber and Leather.** L. B. Conant, Cambridge, Mass., U. S. A. Represented by M. Morin, Berlin W. 57.

500,643. **Electro Deposition.** Anode Rubber Co., Ltd., London, England. Represented by W. Karsten and C. Wiegand, both of Berlin S. W. 11.

501,124. **Accelerating Vulcanization.** Sociéta Italiana Pirelli, Milan, Italy. Represented by W. Ziegler, Berlin-Charlottenburg.

501,642. **Reducing Aging.** I. G. Farbenindustrie A. G., Frankfurt a. M.

General

United States

1,759,983. **Flotation Screen.** H. B. Houston, Dallas, Tex.

1,760,022. **Novelty Noise Maker.** H. L. Stowe, Bridgeport, Conn.

1,760,153. **Telephone Transmitter Base.** M. Luce, Jr., Brookline, assignor to M. Leavitt, Chelsea, both in Mass.

1,760,228. **Milk Strainer.** C. E. Armstrong, Washington, D. C.

1,760,299. **Stocking Protector.** A. B. Dickerson, Newark, N. J.

1,760,426. **Flexible Connection Paneling.** A. F. Masury, assignor to International Motor Co., both of New York, N. Y.

1,760,476. **Swimmers' Foot Appliance.** N. A. Chastenay, Ozone Park, N. Y.

1,760,551. **Twin-Body Tire Valve.** H. Hasting, Detroit, Mich.

1,760,619. **Clutch Plate Connection.** H. T. Woolson, Detroit, assignor to Chrysler Corp., Highland Park, both in Mich.

1,760,841. **Bottle.** N. K. Garhart, Watertown, assignor to Garhart Dental Specialty Co., Somerville, both in Mass.

1,761,109. **Plasterer's Float.** L. S. Dietz, assignor of one-half to F. Dietz, both of Zion, Ill.

1,761,130. **Tire Pressure Gage.** J. E. Kennedy, Los Angeles, Calif.

1,761,218. **Jar Holder.** B. A. Lundy, Larchmont, and S. P. Hull, Yonkers, both in N. Y.

1,761,233. **Buffer.** De F. Roe, Shaker Heights, assignor to Colson Co., Elyria, both in O.

1,761,274. **Vehicle Shock Absorber.** J. F. O'Connor, assignor to W. H. Miner, Inc., both of Chicago, Ill.

1,761,356. **Finger Protector.** G. E. McNamara, Los Angeles, Calif.

1,761,443. **Ornamented Article.** T. F. Hooper, assignor to Miller Rubber Co., both of Akron, O.

1,761,454. **Pressure Indicating Valve.** E. A. Rockwell, New York, N. Y.

1,761,487. **Tire Valve Stem.** E. G. Oakley, Southport, assignor to Bridgeport Brass Co., Bridgeport, both in Conn.

1,761,525. **Steering Wheel.** H. D. Geyer, assignor to Inland Mfg. Co., both of Dayton, O.

1,761,526 and 1,761,527. **Pitman Arm Shock Absorber.** H. D. Geyer, assignor to Inland Mfg. Co., both of Dayton, O.

1,761,666. **Ear Trumpet.** H. D. Hinternesch, Baltimore, Md.

1,761,680. **Float.** W. E. Rawlings, San Jose, Calif.

1,761,967. **Spring Shackle.** L. Blackmore, Highland Park, assignor to General Motors Research Corp., Detroit, both in Mich.

1,762,027. **Time Stamp and Dater.** G. A. Pickup, E. Nashville, Tenn.

1,762,237. **Dental Syringe.** K. G. Moore, Cannon Falls, Minn.

1,762,389. **Resilient Fabric.** R. C. Fagan, assignor to Russell Mfg. Co., both of Middletown, Conn.

1,762,823. **Tube Deflating Valve.** L. G. Krusell, assignor to Fisk Rubber Co., both of Chicopee Falls, Mass.

1,762,865. **Trapper's Glove.** P. G. Heinrich, Eden, N. Y.

1,762,886. **Spring Plank Cushion.** R. J. O'Brien, assignor to Waugh Equipment Co., both of Depew, N. Y.

1,762,887. **Side Bearing Cushion.** R. J. O'Brien, assignor to Waugh Equipment Co., both of Depew, N. Y.

1,762,893. **Inflatable Body Filling Tube.** S. Saul, Aachen, Germany.

1,762,905. **Pneumatic Tire.** H. B. Whitlark, Tarboro, N. C., assignor, by mesne assignments, to Lambert Tire & Rubber Co., Barberton, O.

1,763,179. **Tire Bead Reenforcement.** R. C. Pierce, assignor to National-Standard Co., both of Niles, Mich.

1,763,467. **Toy Palpitating Heart.** H. H. D. Klinker, New York, N. Y.

1,763,522. **Auto Window Construction.** H. M. Hood, Chicago, Ill., assignor to Featheredge Rubber Co., Inc., a corporation of Ill.

1,763,593. **Acid Tank Valve.** M. C. Nelson, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,763,639. **Tire Deflation Signal.** H. S. Christophersen, Odense, Denmark.

1,763,929. **Bathers' Wrist Watch Protector.** P. Kellner, New York, N. Y.

1,763,982. **Journal Box Cushion.** R. J. O'Brien, assignor to Waugh Equipment Co., both of Depew, N. Y.

1,764,000. **Detachable Heel.** W. L. Bernier, Gardner, assignor of one-half to A. G. Pelletier, Winchendon, both in Mass.

1,764,076. **Inner Tube.** J. L. Hayes, Ottawa, Ill.

1,764,208. **Tire Valve Dust Cap.** A. P. Kearns, Newark, N. J.

1,764,353. **Heel.** F. Sansone, New Orleans, La.

1,764,425. **Animal Skinning Device.** L. E. Thomas, Choctaw, Okla.

1,764,533. **Shoe Mending Clamp.** G. H. Schroder, Oakland, Calif.

1,764,852. **Aquatic Buoyant Seat.** T. Phillips, Elsternwick, Melbourne, Victoria, Australia.

1,765,080. **Belt Connection.** P. D. Latimer, Ennis, assignor of seven-tenths to R. N. Burnett and one-fourth to A. M. Bownan, both of Houston, all in Tex.

1,765,093. **Inner Tube.** A. W. Ott, Dubuque, Iowa.

1,765,151. **Attachment for Pencils.** H. P. K. Hansen, Staplehurst, Nebr.

1,765,155. **Heel.** H. Heady, Los Angeles, Calif.

1,765,160. **Dual Tire Wheel.** A. J. Johnsen, Durban, South Africa.

1,765,213. **Tire Deflation Indicator.** R. Depee, Century, Okla.

1,765,333. **Cowl Ventilator.** H. M. Hood, Chicago, Ill., assignor to Featheredge Rubber Co., Inc., a corporation of Ill.

Dominion of Canada

300,499. **Skidless Tire.** L. G. Peters, New York, N. Y., U. S. A.

300,565 and 300,566. **Footwear.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of H. deB. Rice, Bristol, R. I., U. S. A.

300,598. **Elastic Play Ball.** "Kum-Bak" Co., assignee of J. J. Van Etten, both of Detroit, Mich., U. S. A.

300,604. **Garter.** Moore Fabric Co., assignee of J. V. Moore, both of Pawtucket, R. I., U. S. A.

300,614. **Pipe Assembler.** La Société Métallurgique du Périgord, assignee of G. Bertandeau, both of Paris, France.

300,627. **Cushioning Center Bearings.** Waugh Equipment Co., assignee of R. J. O'Brien, both of Depew, N. Y., U. S. A.

300,631. **Tire Valve.** L. H. Harris, Northampton, assignee of one-fourth of W. E. Copithorn, Natick, both in Mass., U. S. A.

300,731. **Suspenders.** P. A. Rossi, Campbell, O., U. S. A.

300,737. **Tire Inflator.** R. L. Rymal, Chicago, Ill., U. S. A.

300,782. **Garment.** Comfolastic Corp., New York, assignee of I. Stern, Brooklyn, both in N. Y., U. S. A.

300,804. **Cushion Tire.** Goodyear Tire & Rubber Co., assignee of R. S. Burdette, both of Akron, O., U. S. A.

300,821. **Belting.** I. B. Kleinert Rubber Co., assignee of V. Guinzburg, both of New York, N. Y., U. S. A.

300,822. **Extensible Band.** I. B. Kleinert Rubber Co., assignee of V. Guinzburg, both of New York, N. Y., U. S. A.

300,854 and 300,855. **Vacuum Sealed Jar.** Vacuum Seal Co., Inc., New York, N. Y., assignee of G. Staunton, New Haven, Conn., both in the U. S. A.

300,857. **Car Buffer Back Stop.** Waugh Equipment Co., assignee of H. D. Page, both of Depew, N. Y., U. S. A.

300,858. **Truck Center Bolster Cushion.** Waugh Equipment Co., Chicago, Ill., assignee of R. J. O'Brien, Depew, N. Y., both in the U. S. A.

300,859. **Side Bearing Cushion.** Waugh Equipment Co., assignee of R. J. O'Brien, both of Depew, N. Y., U. S. A.

300,864. **Inflatable Floating Body.** Dr. Dorogi es Tarsa Gummigyar R. T., Budapest-Albertfalva, assignee of half interest of I. and L. Dorogi, both of Budapest, all in Hungary.

300,875. **Arch Support.** A. LaPrairie, Montreal, P. Q.

300,904. **Tie Holder.** J. Gompertz, Krefeld, Rhineland, Germany.

300,932. **Horseshoe Pad.** R. R. Tweed, Audubon, N. J., U. S. A.

301,036. **Heel.** United Shoe Machinery Co. of Canada, Ltd., Montreal, P. Q., assignee of C. Roberts, Winchester, Mass., U. S. A.

301,039. **Draft Gear Follower Block.** Waugh Equipment Co., Chicago, Ill., assignee of L. M. Clark, Depew, N. Y., both in the U. S. A.

301,057. **Fish Lure.** L. S. Lemere and W. M. Long, co-inventors, both of Seattle, Wash., U. S. A.

301,063. **Necktie.** M. Halpern, Bronx, and W. Mayer, Brooklyn, co-inventors, both in N. Y., U. S. A.

301,108. **Tire.** H. C. Hower, Chicago, Ill., U. S. A.

301,146. **Golf Bag.** S. H. Sutcliffe, Radlett, Hertfordshire, England.

301,157. **Inflated Ball.** W. J. Wycherley, Ossett, York Co., England.

301,190. **Sole and Heel.** Essex Rubber Co., assignee of L. M. Oakley, both of Trenton, N. J., U. S. A.

301,310. **Inflatable Article.** Dr. Dorogi es Tarsa Gummigyar R. T., Budapest-Albertfalva, assignee of half interest of I. and L. Dorogi, both of Budapest, all in Hungary.

United Kingdom

326,760. **Tire.** E. B. Killen, London.

326,883. **Applying Capsules to Bottles.** O. J. Bruun, Frederiksberg, Denmark.

326,919. **Printing Plate.** R. D. Bain, J. Nelson, and Lamson Paragon Supply Co., Ltd., all of London.

327,015. **Heel Pad.** I. MacCallum, Hillhead, Glasgow, Scotland.

327,027. **Stocking.** P. Schönfeld, Chemnitz, Germany.

327,029. **Sole Laying Press.** J. Kewley, Nelson, Lancashire.

327,268. **Tire.** J. C. Hitchner, Philadelphia, Pa., U. S. A.

327,284. **Bathing Cap.** C. M. Grinsell, Four Oaks, Warwickshire.

327,286. **Waist Band.** I. B. Kleinert Rubber Co., assignee of V. Guinzburg, both of New York, N. Y., U. S. A.

327,317. **Mud Guard.** J. F. Meyn, Hamburg, Germany.

327,319. **Lavatory Seat Buffer.** R. G. King, Datchet, Buckinghamshire, and Smith & Davis, Ltd., Birmingham.

327,344. **Anti-Slipping Carpet.** A. L. Neeson, London.

327,422. **Vacuum Sealed Jar.** G. H. Bennett, Hove, Sussex.

327,571. **Sheet Separators.** M. C. Ritchie, Ltd., and M. C. Ritchie, both of London.

327,720. **Golf Club Shaft.** C. F. Mensing, Tarpon Springs, Fla., U. S. A.

327,763. **Packing Inner Tubes.** India Tire & Rubber Co. (Great Britain), Ltd., and J. Cooper, Inchinnan, Renfrewshire.

327,801. **Journal Bearings.** E. F. Zaparka, New York, N. Y., U. S. A.

Germany

500,337. **Antiskid Device.** O. Sekinger, Zurich, Switzerland. Represented by H. Hederich, Kassel.

500,673. **Pneumatic Tire.** F. Tessé, Courneuve, France. Represented by K. Hallbauer and A. Bohr, both of Berlin S. W. 61.

501,410. **Nipple.** M. Hahn, Munich.

501,442. **Closing for Vat.** O. Heller, Erfurt.

501,811. **Bumper.** H., F., and O. Krafft, all of Berlin W. 50.

Designs

1,122,224. **Hammer Head.** Allgemeine Elektricitats-Gesellschaft, Berlin N. W. 40.

1,122,754. **Twin Balloon.** R. Klapper, Berlin-Friedenau.

1,122,845. **Safety Tube.** E. Lehnhardt and H. Schmidt, both of Dusseldorf.

1,122,862. **Colored Sponge Rubber Layers.** H. Munz, Hamburg 33.

1,123,115. **Sponge Rubber Filled Seats.** R. Holstein, Repelen, Kr. Moers.

1,123,248. **Sweat Band.** N. Holzapfel, Bad Kissingen.

1,123,342. **Block Belt.** Continental Gummi-Werke A. G., Hannover.

1,123,472. **Heel.** O. Schlappig, Dusseldorf.

1,123,505. **Motorcycle Handle.** Continental Gummi-Werke A. G., Hannover.

1,123,922. **Boot.** Harburger Gummiwaren-Fabrik Phoenix A. G., Harburg-Wilhelmsburg a. d. E.

1,124,031. **Heel Patch.** S. Hünefeld, Detmold.

1,124,071. **Elastic Band.** Muller & Hussels, Wuppertal-Barmen.

1,124,220. **Armored Hose.** Allgemeine Elektricitats-Gesellschaft, Berlin N. W. 40.

1,124,756. **Lacquered Insulating Tube.** W. Ruppert, Koln-Klettenberg.

1,124,801. **Safety Cushion.** Munden-Hildesheimer Gummiwaren-Fabriken Gebr. Wetzell A. G., Hildesheim.

1,124,899. **Sponge Rubber Toy.** H. Lindemann, Berlin S. W. 68.

1,124,907. **Tanner's Hose.** C. Vollrath & Sohn, Kom. Ges. Bad Blankenburg i. Th.

1,124,947. **Elastic Fabric.** Diedrich Grote Nachf., Kempen a. Rh.

1,124,992. **Pipe for Electric Wires.** Kabelwerk Duisburg, Duisburg Wanheimerort.

1,125,008. **Inner Tube Protector.** H. Meyer, Melle.

1,125,342. **Reenforced Hose.** E. Kubler & Co., G. m. b. H., Berlin-Reinickendorf-West.

1,125,387. **Tire Repair Material.** Gummi-Werke Fulda A. G., Fulda.

1,125,423. **Mail Chute.** Telephon-Apparat-Fabrik E. Zwietusch & Co., G. m. b. H., Berlin-Charlottenburg.

1,125,425. **Nipple.** K. Krieg, Zuffenhausen, Wurtt.

1,125,498. **Door Buffer.** Klockner-Werke A. G., Abteilung Mannstaedtwerke Troisdorf.

1,125,578. **Colored Sponge Rubber.** A. G. Metzeler & Co., Munich.

Designs

United States

81,275. **Hot Water Bottle.** Term 14 years. R. E. Fawn, Cleveland, O., assignor to B. F. Goodrich Co., New York, N. Y.

81,319. **Webbing.** Term 14 years. H. Aull, assignor to Friedberger-Aaron Mfg. Co., both of Philadelphia, Pa.

81,371 and 81,372. **Hot Water Bottle.** Term 7 years. F. R. Brown, assignor to I. B. Kleinert Rubber Co., both of New York, N. Y.

81,390 and 81,391. **Elastic Fabric.** Term 14 years. O. E. Huber, Reading, assignor to Narrow Fabric Co., W. Reading, both in Pa.

81,421. **Hot Water Bottle.** Term 7 years. H. E. Thayer, Pleasantville, assignor to I. B. Kleinert Rubber Co., New York, both in N. Y.

81,424. **Webbing.** Term 3½ years. F. J. Zimmerer, assignor to Russell Mfg. Co., both of Middletown, Conn.

Dominion of Canada

8,696. **Hose.** Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont.

8,711 and 8,712. **Tire.** Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont.

8,713, 8,714, and 8,715. **Tire.** Dominion Rubber Co., Ltd., Montreal, P. Q.

8,716. **Tire Tread.** A. M. Bourbonniere, Montreal, P. Q.

8,729 and 8,730. **Soles.** Phillips Rubber Soles, Ltd., London, England.

8,734. **Hernia Belt.** W. Hyde, Toronto, Ont.

Trade Marks

United States

271,091. Representation of a duck in water and below, the word: **"Downy."** Heels. Bradstone Rubber Co., Woodbine, N. J.

271,106. **Airway.** Soles. Bearfoot Sole Co., Inc., Boston, Mass.

271,112. **Tailored Smartics.** Arctics. Beacon Falls Rubber Shoe Co., Beacon Falls, Conn.

271,128. **Superfect.** Tires and tubes. Mohawk Rubber Co., Akron, O.

271,132. **Brogan.** Tires. Corduroy Tire Co., Grand Rapids, Mich.

271,138. **Long Drive.** Tires, casings, and tubes. Pharis Tire & Rubber Co., Newark, O.

271,214. **Faure Imperial Cord.** Tires. Biggs & Black, Inc., New York, N. Y.

271,289. Circle containing the word: **"Pacific."** Golf balls. Pacific Golf Ball, Ltd., San Francisco, Calif.

271,290. Circle. Golf balls. Wright & Ditson, Boston, Mass.

271,364. **Conservo.** Hose and belting. Hewitt-Gutta Percha Rubber Corp., Buffalo, N. Y.

271,390. **White Seal.** Hose, belting, and packing. Hewitt-Gutta Percha Rubber Corp., Buffalo, N. Y.

271,391. **Seneca.** Belting. Hewitt-Gutta Percha Rubber Corp., Buffalo, N. Y.

271,392. **Oriole.** Packing. Hewitt-Gutta Percha Rubber Corp., Buffalo, N. Y.

271,393. **Karimor.** Hose and belting. Hewitt-Gutta Percha Rubber Corp., Buffalo, N. Y.

271,600. **Lac-Kard.** Insulated wire. Packard Electric Co., Warren, O.

271,618. **Darex.** Filtering sheets. Dewey & Almy Chemical Co., N. Cambridge, Mass.

271,624. **Rainbow.** Doilies. Webster Rubber Co., Sabbatus, Me.

271,713. **Raybestos.** Belts, hose, and tubing. Raybestos-Manhattan, Inc., Bridgeport, Conn.

271,805. Representation of an anchor with a label containing the words: **"Duro Gloss,"** and above, the word: **"Padanker."** Mats under rugs to prevent slipping. J. C. Haartz Co., New Haven, Conn.

Dominion of Canada

49,329. **Plee-Zing.** Atomizers, jar rubbers, etc. George W. Simmons Corp., St. Louis, Mo., U. S. A.

49,339. Words: **"Fashion Lane Footwear"** within scrolls. Footwear. Governor & Co. of Adventurers of England Trading into Hudson's Bay, London, England, and Winnipeg, Man.

49,460. **Vulcafor.** Chemical substances used in manufacturing rubber. British Dyestuffs Corp., Ltd., Blackley, Manchester, England.

49,489. **Maxmarking.** Tennis, golf, and play balls, and quoits. Dunlop Tire & Rubber Goods Co., Ltd., Toronto.

49,500. **All Weather.** Storage batteries. Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont.

49,517. **Duragrip.** Plates or pads for attaching to footwear. Phillips' Patents, Ltd., London, E. C. I, Eng.

49,559 and 49,568. **Hats Gripper.** Nipples. W. W. Hatfield, Vancouver, B. C.

49,577. **Hydrotite.** Clothing. Greengate & Irwell Rubber Co., Ltd., Salford, Lancaster, England.

49,589. **Zeppelin.** Tires, treads, tire shoes, inner tubes, non-skid devices, tire protectors, tire and tube repair outfits, repair patches and bandages therefor. Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont.

49,591. Four circular spots in quadrilateral closely spaced arrangement. Golf and other balls. Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont.

49,592. Three spots of quadrilateral shape in a triangular closely spaced arrangement. Golf and other balls. Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont.

49,593. Three circular spots in triangular closely spaced arrangement. Golf and other balls. Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont.

49,600. Letter: **"R"** in a triangular figure. Fabrics and hosiery of caoutchouc, girdles, etc., for surgical and orthopedic purposes, etc. Julius Romper Atg., Zeulenroda, Germany.

United Kingdom

502,306. **Ipac.** Adhesives. B. Roozendaal, Haarlem, Holland.

507,743. Circle containing two wavy lines and the letters: **"ICI."** Goods of rubber and gutta percha not included in any other classes than Class 40. Imperial Chemical Industries, Ltd., London, S. W. 1.

507,750. Circle containing two wavy lines and the letters: **"ICI."** Adhesives, cement, dressings, tire puncture closing compositions, etc. Imperial Chemical Industries, Ltd., London, S. W. 1.

508,822. **Spenite.** Vulcanized rubber and cellulose composition for use as a substitute for wood. Spen Rubber Works, Ltd., Hecknondwike, Yorkshire.

509,552. **Valox.** Goods of rubber and gutta percha not included in any other classes, but Class 40. P. C. Oxborrow, Southampton.

510,252. **Codan.** Tires and tubes. Dansk Galoche-Og Gummifabrik Aktieselskabet, Copenhagen, Denmark.

510,448. Circle containing representation of two eagles and above, the words: **"Double Eagle."** Batteries. Goodyear Tire & Rubber Co., Akron, O., U. S. A.

511,530. **Imperator.** Horse shoes. Imperator Hestesko Aktieselskapet, Tonsberg, Norway.

512,321. **Vulcan.** All goods in Class 40 except solutions and compounds for tires and tubes, etc. S. A. Eglington, trading as F. Eglington, Walsall.

Rims Approved by The Tire & Rim Association, Inc.

Rim Size	6 Months, 1929 Number	6 Months, 1929 Per Cent	6 Months, 1930 Number	6 Months, 1930 Per Cent
Motorcycle				
24x3 CC	10,464	0.1	.....	...
24x3 Std.	4,668	0.0	132	0.0
26x3 CC	1,971	0.0	.....	...
26x3 Std.	1,035	0.0	.....	...
28x3 CC	1,114	0.0	.....	...
18x3 SS	14,074	0.1	13,920	0.1
19x3 SS	10,516	0.1	23,845	0.2
Clincher				
30x3½	135,424	1.0	31,592	0.3
31x4	765	0.0	150	0.0
18" Balloon				
18x3½	.....	...	645	0.0
18x4	828,802	5.8	748,620	6.8
18x3.25	75,681	0.5	25,185	0.2
18x4½	235,912	1.7	77,852	0.7
18x5	53,628	0.4	44,493	0.4
18x6	.....	...	20	0.0
19" Balloon				
19x2.75	218,600	1.5	2,296,606	20.9
19x3.00	.....	...	422,334	3.8
19x3½	474,041	3.3	165,410	1.5
19x4	2,719,827	19.2	1,216,451	11.1
19x3.25	181,687	1.3	21,926	0.2
19x4½	372,063	2.6	253,410	2.3
19x5	75,170	0.5	85,080	0.8
19x6	.....	...	12	0.0
19x2.75 DC	.....	...	36,698	0.3
19x3.00 DC	.....	...	3,131,898	28.5
19x3.00 Semi	.....	...	59,174	0.5
20" Balloon				
20x2.75	3,684,632	25.9	10,291	0.1
20x3½	62,217	0.4	34,574	0.3
20x4	1,354,265	9.6	99,201	0.9
20x4½	236,868	1.7	101,701	0.9
20x5	224,439	1.6	8,484	0.1
20x6	35,783	0.3	631	0.0
20x4.00 DC	12,206	0.1	10,079	0.1
21" Balloon				
21x2.75	107,288	0.8	.....	...
21x3½	182,612	1.3	103,453	1.0
21x4	45,934	0.3	19,258	0.2
21x4½	28,770	0.2	14,689	0.1
21x5	4,046	0.0	938	0.0
21x6	2,505	0.0	3,197	0.0
22" Balloon				
22x4	909	0.0	1,358	0.0
22x4½	901	0.0	173	0.0
High Pressure				
30x3½	16,979	0.1	5,043	0.0
32x3½	1,056	0.0	.....	...
31x4	1,086	0.0	.....	...
32x4½	29,718	0.2	6,004	0.1
32x4	14,774	0.1	6,041	0.1
34x4½	2,181	0.0	3,338	0.0
20" Truck				
30x5	2,157,194	15.2	1,400,924	12.7
32x6	280,328	2.0	213,633	1.9
34x7	102,177	0.7	146,950	1.3
36x8	71,042	0.5	76,989	0.7
40x10	304	0.0	.....	...
9-10/20	.....	...	7,265	0.1
40x10.50	591	0.0	851	0.0
42x11	.....	...	376	0.0
22" Truck				
36x7	1,924	0.0	2,180	0.0
38x8	7,110	0.1	12,929	0.1
9-10/22	.....	...	1,354	0.0
24" Truck				
34x5	3,064	0.0	1,422	0.0
36x6	23,201	0.2	6,846	0.1
38x7	30,838	0.2	11,690	0.1
40x8	41,597	0.3	32,457	0.3
44x10	246	0.0	383	0.0
9-10/24	.....	...	2,853	0.0
46x11	.....	...	160	0.0
Airplane				
14x3	346	0.0	.....	...
16x3	43	0.0	.....	...
18x3	1,669	0.0	563	0.0
24x3	581	0.0	283	0.0
23x3½	1,051	0.0	514	0.0
27x3½	4,068	0.0	.....	...
28x4	1,546	0.0	.....	...
30x5	221	0.0	.....	...
32x6	534	0.0	209	0.0
36x8	428	0.0	103	0.0
44x10	109	0.0	25	0.0
26x4 Cl.	7,730	0.1	.....	...
Totals	14,202,553	...	11,004,865	...

Official Rubber Goods Production Statistics

	1930					1929		Per Cent Increase (+) or Decrease (—)		Cumulative Total from Jan. 1 Through Apr. 30		Per Cent Increase (+) or Decrease (—)
	Jan.	Feb.	Mar.	Apr.	May	Apr.	May	May, 1930, from Apr., 1930	May, 1930, from May, 1929	1929	1930	Cumulative 1930 from 1929
Tires and Tubes												
Pneumatic tires:												
Production ...thousands	3,589	3,645	3,891	*4,518	4,574	5,913	6,109	+ 1.2	—25.1	27,887	20,217	—27.5
Stocks, end of month...thousands	9,539	9,929	10,010	*10,461	10,745	12,697	13,386	+ 2.7	—19.7	50,605	50,684	+ 0.2
Shipments—												
Domestic ...thousands	3,348	3,150	3,587	*3,886	3,960	5,242	5,185	+ 1.9	—23.3	.....	.....	....
Export ...thousands	178	206	186	*186	213	229	204	+14.5	+ 4.4	1,120	969	—13.5
Inner tubes:												
Production ...thousands	3,685	3,707	3,953	*4,408	4,429	5,726	5,745	+ 0.5	—23.8	27,036	20,182	—25.3
Stocks, end of month...thousands	10,163	10,429	10,543	*11,028	11,082	13,601	14,196	+ 0.5	—22.8	.....	.....	....
Shipments—												
Domestic ...thousands	3,778	3,344	3,682	*3,769	3,940	5,220	5,146	+ 4.5	—23.9	24,341	18,513	—24.1
Export ...thousands	107	126	99	*109	119	153	133	+ 9.2	—10.5	753	560	—25.6
Solid and cushion:												
Production ...thousands	25	22	19	17	17	39	40	....	—57.5	177	100	—43.5
Stocks, end of month...thousands	127	128	123	117	108	139	135	— 7.7	—20.0	.....	.....	....
Shipments—												
Domestic ...thousands	20	19	22	*23	23	40	40	.....	—42.5	179	107	—40.2
Export ...thousands	2	2	2	2	1	3	3	—50.0	—66.7	12	9	—25.0
Other Rubber Products												
Rubber-proofed fabrics, production:												
Total ...thous. of yds.	3,281	3,441	3,570	4,029	3,775	4,000	4,860	— 6.3	—22.3	18,668	18,096	— 3.1
Auto fabrics ...thous. of yds.	966	885	727	1,368	1,239	917	919	— 9.4	+34.8	4,211	5,185	+23.1
All other ...thous. of yds.	1,076	1,081	1,211	1,071	1,333	1,194	1,554	+24.5	—14.2	8,113	7,269	—10.4
Raincoat fabrics...thous. of yds.	1,239	1,475	1,632	1,590	1,205	1,889	2,387	—24.2	—49.5	6,344	5,644	—11.0
Rubber heels:												
Production ...thous. of pairs	15,470	14,172	15,439	17,762	15,603	17,256	19,541	—12.2	—20.2	92,977	78,446	—15.6
Shipments—												
To shoe manufacturers...thous. of pairs	10,989	8,837	8,458	9,201	7,431	11,028	12,552	—19.2	—40.8	55,441	44,916	—19.0
To repair trade...thous. of pairs	5,106	6,511	7,189	4,641	5,221	6,506	7,604	+12.5	—31.3	35,581	28,668	—19.4
For export...thous. of pairs	1,049	1,031	956	1,096	776	1,072	1,054	—29.2	—26.4	5,836	4,908	—15.9
Stocks, end of month...thous. of pairs	40,528	38,250	36,546	37,618	38,595	47,209	44,969	+ 2.6	—14.2	.....	.....	....
Rubber soles:												
Production ...thous. of pairs	3,496	2,338	2,582	2,593	1,939	2,601	2,916	—25.2	—33.5	15,008	12,948	—13.7
Shipments—												
To shoe manufacturers...thous. of pairs	3,261	1,973	2,055	1,956	1,506	1,967	2,361	—23.0	—36.2	11,341	10,751	— 5.2
To repair trade...thous. of pairs	491	392	407	380	332	623	635	—12.6	—47.7	3,579	2,002	—44.1
For export...thous. of pairs	138	56	54	28	27	23	32	— 3.6	—15.6	269	303	+12.6
Stocks, end of month...thous. of pairs	3,227	3,171	3,349	3,272	3,019	4,184	3,997	— 7.7	—24.5	.....	.....	....
Mechanical rubber goods:												
Shipments—												
Total ...thous. of dolls	5,169	5,376	5,981	5,989	6,163	7,035	7,188	+ 2.9	—14.3	33,404	28,678	—14.2
Belting ...thous. of dolls	1,150	1,281	1,379	1,309	1,310	1,668	1,798	+ 0.1	—27.2	7,730	6,429	—16.8
Hose ...thous. of dolls	2,034	2,190	2,500	2,593	2,703	2,730	2,643	+ 4.2	+ 2.3	12,755	12,020	....
All other ...thous. of dolls	1,984	1,905	2,101	2,087	2,150	2,636	2,748	+ 3.0	—21.8	12,921	10,227	—20.9
Rubber bands, shipments...thous. of lbs.	226	230	248	197	211	231	205	+ 7.1	+ 2.9	1,183	1,112	— 6.0
Rubber flooring, shipments...thous. of sq. ft.	459	530	533	570	615	596	733	+ 7.9	—16.1	2,782	2,707	— 2.7
Calendered rubber clothing:												
Production ...no. coats and sundries	56,949	64,934	78,858	86,471	75,719	91,193	100,706	—12.4	—24.8	387,594	362,931	— 6.4
Net orders...no. coats and sundries	31,638	39,568	97,612	89,862	110,520	102,490	78,972	+23.0	+39.9	276,152	369,200	+33.7

*Revised.

Source: *Survey of Current Business.* Bureau of Foreign and Domestic Commerce, Department of Commerce, Washington, D. C.

Tire Production Statistics

	High Pressure Pneumatic Casings					
	All Types			Cord		
	Inventory	Production	Total Shipments	Inventory	Production	Total Shipments
1928	10,217,708	58,457,873	55,721,937	3,580,576	19,302,218	19,351,380
1929	9,470,368	54,980,672	55,515,884	2,290,236	13,765,025	15,016,460
1930						
January	9,539,353	3,558,862	3,525,404	2,382,959	804,783	713,713
February	9,928,838	3,644,606	3,355,844	2,474,495	662,419	599,599
March	10,010,173	3,890,981	3,773,865	2,458,117	572,417	588,613
April	10,461,208	4,518,034	4,071,822	2,493,603	656,281	610,308
May	10,745,389	4,573,895	4,173,177	2,421,953	618,012	677,999

	Balloon Casings			Solid and Cushion Tires		
	Inventory	Production	Total Shipments	Inventory	Production	Total Shipments
1928	6,594,978	38,878,218	35,931,982	152,120	508,223	512,602
1929	7,160,127	41,128,577	40,377,781	122,200	409,344	427,779
1930						
January	7,139,154	2,779,864	2,805,740	126,784	25,049	21,476
February	7,436,247	2,975,922	2,750,324	127,793	22,302	21,005
March	7,535,468	3,311,978	3,177,634	123,179	19,329	23,951
April	7,951,317	3,854,540	3,454,171	116,595	17,335	24,232
May	8,323,436	3,955,883	3,495,178	108,055	16,752	24,426

	High Pressure Inner Tubes			Balloon Inner Tubes		
	Inventory	Production	Total Shipments	Inventory	Production	Total Shipments
1928	5,037,716	23,255,891	23,749,966	7,049,748	36,878,990	34,095,223
1929	3,339,451	16,100,281	17,718,806	6,889,213	38,921,749	38,719,177
1930						
January	3,233,813	783,709	889,208	6,911,422	2,898,682	2,992,752
February	3,243,130	675,126	680,989	7,171,395	3,030,745	2,786,578
March	3,137,472	619,416	696,161	7,392,794	3,331,739	3,082,456
April	3,144,558	678,152	674,032	7,871,181	3,723,177	3,202,261
May	2,983,388	683,236	769,463	8,098,115	3,745,131	3,289,384

	Cotton and Rubber Consumption Casings, Tubes, Solid and Cushion Tires		Consumption of Motor Gasoline (100%) Gallons
	Cotton Fabric Pounds	Crude Rubber Pounds	
1928	222,243,398	600,423,401	13,633,452,000
1929	208,824,653	583,039,984	14,748,552,000
1930			
January	14,559,163	42,108,149	1,080,660,000
February	13,766,977	40,378,929	1,060,640,000
March	14,655,987	43,910,926	1,241,240,000
April	17,263,963	51,151,863	1,382,400,000
May	17,436,928	52,130,471	1,459,880,000

Rubber Manufacturers Association figures representing 75 per cent of the industry.

MARKET REVIEWS

Crude Rubber

New York Exchange

DEPENDENT as it is on the automobile industry, the rubber market has been a real companion in misery. Dragging dully along, prices have gradually slipped to lower and lower levels. The future outlook is still clouded by the huge world stocks of rubber, and most people are settling for a long siege.

The automobile index reached the lowest point since 1926 and passed the low of last December by about 17 points. Suspension of operations by Ford had the expected result, and production figures dropped more than 40 points. Instead of the two weeks' shutdown originally planned, the Ford plants will be closed for three weeks. When they reopen, an operation schedule nearly 20 per cent lower than in effect early in July will be carried out, and this reduction of 2,000 cars a day will not be easily balanced by increases from other makers.

Certain manufacturers are increasing their activities with the introduction of new models, but total results on production figures are expected to be small. A tendency has been noted on the part of far-sighted market prognosticators to hedge on their earlier predictions as to a fall revival in activity. The inclination now is to put off the expected upturn until the first of the new year.

Tire manufacturers are faring poorly: factories are working on reduced schedules, and strong efforts are being made to curtail production to the consumption figures. A balance between crude rubber consumption and shipments received is hardly likely for July. Consumption is not expected to reach 30,000 tons, and shipments to all ports out of Malaya were estimated to be about 42,500 tons.

The efforts of the Dutch producers to restrict production by enlisting governmental aid, remind one of the efforts of our Farm Board in their attempts to regulate and sustain the price of cotton and wheat.

Producers representing a majority in rubber tonnage are in favor of a 25 per cent restriction agreement and of asking government enforcement. Action by the government is extremely unlikely and would serve only to foster an uneconomic situation. It may be pessimistic, but we do not believe that any attempts at restriction, government aid or no, will correct the situation. A strong reason for this opinion is presented in cables that were recently received by the New York Rubber Exchange, as follows:

Production of crude rubber on estates of more than 100 acres in the Far East during June totaled 20,295 tons, against 3,644 tons in May. Estate stocks on June 30 were 22,998 tons, against 12,577 tons on May 31. The sharp increases in production and stocks are due to the fact that production was resumed in June, after the cessation of tapping during the month of May.

RUBBER BULL POINTS

1. New models of automobiles will probably make for increased tire demand in August.
2. Consumption of crude rubber for the first six months of 1930 was the highest on record with the exception of 1929. Consumption was 4.4 per cent above same period in 1928, 6.8 per cent above 1927, 19.2 per cent above 1925, and 266.9 per cent over 1921.

RUBBER BEAR POINTS

1. Production is running ahead of demand.
2. Large stocks of tires are on hand.
3. Demand for tires is lower than in last two years.
4. Suspension by Ford depresses automobile index to record low point of 42.9, a decline of 40.4 in the week of July 19.
5. Supplies of crude rubber continue excessive because of lessened demand.
6. Automobile production for first six months of 1930 in the United States and Canada was 32 per cent less than in the same period last year, with June output estimated to be about 39 per cent less than last year.
7. Consumption of crude rubber for June was 34,463 tons against 39,902 tons in May and 43,228 in June, 1929. Consumption in June was 20.3 per cent below June a year ago and 8.5 per cent less than June, 1928.
8. Sales of automobile tires for replacement this year seem likely to fail by a wide margin to reach earlier estimates, in spite of recent efforts to stimulate business through reduction of prices.
9. Consumption of crude rubber will be some 12 per cent under preliminary estimates and fully 14 per cent less than 1929 requirements, whereas production capacity is being steadily expanded.

ment could unquestionably regulate the amount of rubber shipped from the ports. But is it possible to curtail native production and the accumulation of surplus stocks pending the release of the ban on exports?

However, the brave efforts of the Dutch are being closely watched. Action by the British is not expected at all if the Dutch efforts fail, and they are doubtful in any event. Singapore advices also seem to indicate that Asiatic producers are considering a resolution similar to that of the Dutch, if it succeeds with them first.

Trading in old July rubber ceased on the Exchange at the new all-time record low of 10.50 cents. To most producers this price meant operating at a loss. The prospects now are that a price level similar to the July record low, or perhaps even less, will prevail for some time to come. It will simply mean that only the fittest will survive, and the sooner this economic readjustment is effected, the better will the chances be for recovery.

Week ended June 28: Prices held rather firm, but any upward advance, even though small, encountered selling pressure. In spite of the hovering bear interest ready to pounce on the market at the slightest upturn, prices ended the week at advances of 50 to 70 points advance, with July at 12.46.

Consumption of crude rubber by American manufacturers during the present month will total approximately 32,000 long tons, it was estimated by members of the Rubber Exchange of New York, based upon operating schedules maintained this month at Akron and other producing centers. This will represent a decline of about 8,000 long tons from the May consumption

Rubber Exchange
Daily Futures—Smoked Sheets—Clearing House Prices—Cents Per Pound—"No. 1 Standard" Contracts

Positions 1930	June, 1930 23	24	25	26	27	28	30	July, 1930 1	2	3	4*	5*	7	8	9
June	11.82	11.82	12.08	12.05	....	....	....	....	....	....	....	....	....	....	....
July	11.92	11.92	12.18	12.15	12.35	12.46	12.25	12.25	12.20	11.95	....	....	11.85	11.72	11.56
Aug.	12.12	12.15	12.35	12.35	12.52	12.66	12.46	12.38	12.35	12.12	....	....	12.05	11.85	11.69
Sept.	12.32	12.35	12.63	12.55	12.70	12.86	12.68	12.52	12.50	12.30	....	....	12.25	11.99	11.83
Oct.	12.51	12.54	12.80	12.74	12.90	13.06	12.87	12.71	12.67	12.49	....	....	12.40	12.16	12.01
Nov.	12.69	12.73	12.96	12.91	13.10	13.26	13.07	12.90	12.84	12.66	....	....	12.55	12.32	12.18
Dec.	12.87	12.92	13.13	13.05	13.30	13.46	13.25	13.09	13.02	12.80	....	....	12.70	12.49	12.35
1931															
Jan.	13.05	13.10	13.32	13.24	13.47	13.63	13.42	13.28	13.20	13.03	....	....	12.90	12.66	12.50
Feb.	13.22	13.28	13.51	13.42	13.64	13.79	13.57	13.46	13.38	13.21	....	....	13.10	12.83	12.64
Mar.	13.39	13.45	13.70	13.60	13.82	13.95	13.72	13.65	13.55	13.39	....	....	13.30	13.01	12.75
Apr.	13.56	13.63	13.89	13.78	14.00	14.12	13.88	13.83	13.73	13.57	....	....	13.48	13.19	12.95
May	13.73	13.81	14.08	13.96	14.17	14.28	14.04	14.01	13.91	13.75	....	....	13.66	13.37	13.12
June	....	....	....	....	....	....	....	14.19	14.09	13.93	....	....	13.84	13.55	13.29

* Holiday.

Positions 1930	July, 1930 10	11	12	14	15	16	17	18	19	21	22	23	24	25	26
June	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
July	11.52	11.02	11.02	11.00	11.05	11.00	10.84	10.70	10.70	10.72	10.92	10.67	10.70	10.67	10.67
Aug.	11.66	11.14	11.14	11.08	11.17	11.11	10.97	10.82	10.80	10.82	11.02	10.70	10.80	10.77	10.77
Sept.	11.78	11.27	11.30	11.17	11.29	11.22	11.10	10.95	10.90	10.92	11.12	10.87	10.90	10.87	10.87
Oct.	11.95	11.45	11.45	11.33	11.45	11.37	11.24	11.10	11.05	11.07	11.27	11.01	11.04	11.00	11.00
Nov.	12.12	11.63	11.60	11.59	11.60	11.52	11.36	11.25	11.20	11.21	11.41	11.14	11.17	11.13	11.13
Dec.	12.30	11.82	11.75	11.65	11.75	11.65	11.50	11.40	11.35	11.35	11.55	11.28	11.30	11.26	11.26
1931															
Jan.	12.43	11.94	11.95	11.80	11.92	11.84	11.67	11.56	11.51	11.50	11.74	11.47	11.47	11.42	11.42
Feb.	12.56	12.08	12.07	11.95	12.08	12.01	11.84	11.73	11.67	11.65	11.93	11.66	11.63	11.58	11.58
Mar.	12.70	12.20	12.19	12.10	12.25	12.17	12.02	11.90	11.83	11.80	12.12	11.85	11.80	11.73	11.73
Apr.	12.87	12.42	12.40	12.30	12.42	12.32	12.18	12.08	12.01	12.02	12.26	12.00	11.97	11.91	11.91
May	13.04	12.65	12.60	12.50	12.60	12.47	12.35	12.26	12.20	12.27	12.40	12.15	12.14	12.10	12.10
June	13.21	12.85	12.80	12.67	12.77	12.63	12.51	12.43	12.37	12.44	12.57	12.32	12.31	12.28	12.28

total and 11,500 tons from June last year when consumption reached 43,430 tons.

There was evidence of absorption by Wall Street commission houses and uptown trade interests, but the weakness of stocks and grains prompted renewed liquidation in face of any firming in prices.

On June 26 the meeting of British and Dutch producers was held to discuss restriction. Results of the meeting were rather vague, but it is believed that British interests favored a restriction of 25 per cent of output over the entire producing area.

As has been held previously, restriction and tapping holidays are of doubtful benefit because of the difficulty in securing the cooperation of the native producers. With large reserve areas and a working force that must be kept busy if it is to be kept on the plantations, the chances of including them in a general agreement are almost nil.

The F. R. Henderson Corp. in its weekly market summary expressed the opinion that, "With the better feeling generally and a truer understanding of actual business conditions, we believe that rubber will be one of the first of the commodities to move to a higher level of prices." Prices on June 28 on No. 1 Standard contract were:

Position	High	Low	Close	Yesterday's Close
July	....	....	12.46	12.35
Aug.	....	....	12.66	12.52
Sept.	....	....	12.86	12.70
Oct.	....	....	13.06	12.90
Nov.	....	....	13.26	13.10
Dec.	13.45	13.42	13.46@13.50	13.30@13.35
Jan.	....	....	13.63	13.47
Feb.	....	....	13.79	13.64
Mar.	13.97	13.96	13.95@13.97	13.82@13.88
Apr.	....	....	14.12	14.00
May	....	....	14.28	14.17

Week ended July 5: With only a four-day week and most of the traders anxious to get out of the city for the rather protracted week-end, the market was dull. Prices hovered between 12.10 and 12.20 for July during the first three days and then declined slightly because of lack of buying interest and not because of adverse news.

RUBBER EXCHANGE ACTIVITIES

Transactions

Week Ended	Contracts Sold: Number	Contracts Sold: Tons	Transferable Notices	Week-End Tone
June 28....	1,452	3,630.0	302	Very steady
July 5.....	486	1,215.0	211	Barely steady
July 12....	1,910	4,775.0	210	Easy
July 19....	837	2,092.5	35	Quiet
July 26....	644	1,610.0	38	Dull
Totals.....	5,329	13,322.5	796	

On Thursday steadier cables were reflected in higher prices, with July closing at 12.40. Buying was restricted owing to talk of decreased consumption during the current month.

Factories are curtailing output as rapidly as possible in anticipation of the usual seasonal decline expected in the next two months. Reduction of output will be continued during the summer until retail buying becomes more assertive and until inventories are further reduced. The peak of inventories is reached about June 1, and July is the month when shutdowns for inventories and vacations are made.

The Commerce Department statistics on rubber invoiced to the United States during June show that shipments have generally held up to the level normally prevailing, despite the May tapping holiday. Prices on July 3 on No. 1 Standard contract follow:

Position	High	Low	Close	Yesterday's Close
July	....	....	11.95	12.20
Aug.	....	....	12.12	12.35
Sept.	12.41	12.35	12.30@12.35	12.50
Oct.	....	....	12.49	12.67
Nov.	....	....	12.66	12.84
Dec.	12.95	12.95	12.80@12.90	13.02@13.07
Jan.	....	....	13.03	13.20
Feb.	....	....	13.21	13.38
Mar.	13.55	13.40	13.39@13.40	13.55@13.60
Apr.	....	....	13.57	13.73
May	....	....	13.75	13.91
June	....	....	13.93	14.09

Week ended July 12: Under the lack of constructive news, the break in London, and heavy bear selling by local dealers, rubber reached a new low level on July 11, at 10.80 cents in the "A" contract. London spot was quoted at 5¾ pence.

After a ten-day period of suspension, most of the tire factories in Akron resumed operations on Monday.

June production of automobiles and trucks was approximately 343,000, against 441,826 in May in the United States and Canada. In June of last year production was 567,424 units. The National Automobile Chamber of Commerce estimated production for the first six months of this year at 2,322,211, against 3,413,804 in the first six months of 1929. Prices on July 12 on No. 1 Standard contract were:

Position	High	Low	Close	Yesterday's Close
July	....	....	11.02	11.02
Aug.	....	....	11.14	11.14
Sept.	11.30	11.30	11.30@11.35	11.27
Oct.	....	....	11.45	11.45
Nov.	....	....	11.60	11.63
Dec.	11.82	11.82	11.75@11.80	11.82
Jan.	11.95	11.95	11.95@11.97	11.94
Feb.	....	....	12.07	12.08
Mar.	12.30	12.20	12.19@12.20	12.20
Apr.	....	....	12.40	12.42
May	....	....	12.60@12.65	12.65
June	....	....	12.80	12.85

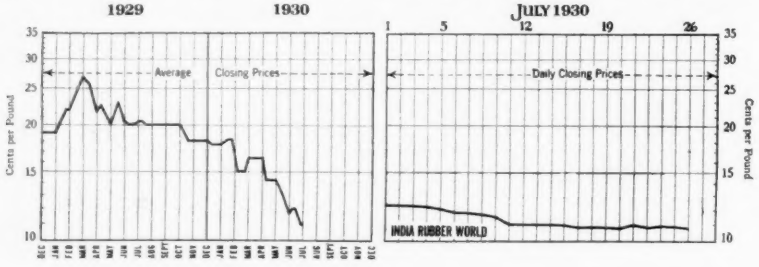
Week ended July 19: Attention was centered on the Dutch rubber producers in Amsterdam. At a meeting held on Thursday it was voted to negotiate with the Dutch East Indian Government for restriction for all rubber producers, including natives, to 75 per cent of the 1929 crop. The announcement of the results did not meet with much favor, and the market dropped off to new low levels at 10.60 cents.

In reference to attempts to restrict production, the chief difficulty lies in the small native holders. Production in Malaya in the first four months of 1930 on estates of over 100 acres of 77,592 tons, show native production of 71,111 tons, total shipments of 148,503 tons, of which the native ratio totaled 48 per cent. For the same period figures of Dutch East Indies show production of estate rubber of 51,988 tons, native production of 33,634 tons, and exports of 85,622 tons, of which the native ratio was 39 per cent. It appears from the above figures that the threat of Malayan native production is even more serious. Prices on July 19 on No. 1 Standard contract were:

Position	High	Low	Close	Yesterday's Close
July	....	....	10.70	10.70
Aug.	....	....	10.80	10.80
Sept.	....	....	10.90@10.95	10.95
Oct.	....	....	11.05	11.10
Nov.	....	....	11.20	11.25
Dec.	11.40	11.35	11.35@11.39	11.40@11.45
Jan.	....	....	11.51	11.56
Feb.	....	....	11.67	11.73
Mar.	11.87	11.85	11.83@11.85	11.90@11.95
Apr.	....	....	12.01	12.08
May	....	....	12.20@12.23	12.26
June	....	....	12.37	12.43

Week ended July 26: Trading was ex-

New York Outside Market—Spot Closing Prices Ribbed Smoked Sheets



New York Outside Market—Spot Closing Rubber Prices—Cents Per Pound

	June, 1930: 23	24	25	26	27	28	30	July, 1930: 1	2	3	4*	5*	7	8	9	10	11	12	14	15	16	17	18	19
Ribbed Smoked Sheet....	12	12	12⅜	12⅜	12¼	12½	12⅜	12⅜	12¼	12⅛	....	....	11⅞	11⅞	11⅝	11½	11	11	11	11⅛	11	10⅞	10⅞	10⅞
No. 1 Thin Latex Crepe.	12¼	12¼	12½	12½	12⅝	12⅞	12¾	12¾	12⅝	12½	....	....	12⅜	12¼	12⅛	12	11⅝	11⅝	11½	11½	11½	11⅜	11¼	11¼
No. 1 Thick Latex Crepe	12	12	12⅛	12⅛	12¼	12½	12⅜	12⅜	12¼	12¼	....	....	12	11⅞	11⅝	11½	11	11	11	11⅛	11	10⅞	10⅞	10⅞
No. 1 Brown Crepe	11⅛	11¼	11⅜	11⅜	11⅜	11⅝	11⅜	11½	11⅜	11⅜	....	....	11¾	11¼	11	10⅞	10¾	10¾	10¾	10¾	10¾	10¼	10⅛	10⅛
No. 2 Brown Crepe	10⅞	11	11⅛	11⅛	11⅛	11⅜	11⅛	11¼	11⅛	11⅛	....	....	11⅛	10⅞	10⅝	10⅝	10⅛	10⅛	10⅛	10⅛	10	9⅞	9⅞	9⅞
No. 2 Amber	11¼	11¼	11⅜	11⅜	11⅜	11⅝	11⅜	11½	11⅜	11⅜	....	....	11⅜	11¼	11	10⅞	10⅛	10⅛	10⅛	10½	10⅛	10¼	10⅛	10⅛
No. 3 Amber	11	11	11⅛	11⅛	11⅛	11⅜	11⅛	11¼	11⅛	11¼	....	....	11¼	10⅞	10¾	10⅝	10⅛	10⅛	10⅛	10¼	10	9⅞	9⅞	9⅞
No. 4 Amber	10½	10½	10⅝	10¾	10¾	11	10¾	10⅞	10¾	10⅝	....	....	10¾	10½	10⅜	10⅛	9⅞	9⅞	9¾	9⅞	9¾	9⅝	9⅝	9⅝
Rolled Brown	8⅝	8⅝	8¾	8¾	8¾	9⅛	9	8⅞	8⅞	8⅞	....	....	8⅞	8⅝	8⅝	8⅝	8½	8½	8½	8½	8½	8⅜	8⅜	8⅜

* Holiday.

tremely dull during the week. Prices slipped very gradually, with the old July contract at 10.50 cents, a new all-time record low, when trading ceased. The lack of interest in the market may be ascribed partly to the record hot weather during the week.

Factory inquiry was light although the attractive prices were taken advantage of by a few manufacturers who were not overstocked. Replacement tire business has not come up to expectations, and tire factories are operating on reduced schedules. Automobile manufacturers have been closing for inventories and vacations, but it is expected that they will increase their activities beginning with next month when new models are expected to appear.

Two cables in reference to restriction were received during the week. A cable from Amsterdam read: "At a meeting of Dutch rubber producers, 112 companies representating a production of 38,905 tons annually declared themselves in favor of a proposal in regard to restriction, while 21 producers representing 25,992 tons belonging to American interests who work the product in their own factories voted against the proposals."

The Asiatic Planters Association adopted a similar resolution, pending the success of the Dutch proposal.

Shipments from the Far East for the week of July 19 dropped to 6,507 tons, compared with 8,452 tons in the week of July 12, and 9,036 tons in the week of May 10. It is unlikely that this can be taken as a sign that the trend is definitely downward, but shipments have been on the decline since May 10.

Dutch East Indies rubber shipments during June totaled 19,321 tons, compared with 25,329 tons in the previous month.

Consumption of crude rubber of all classes by manufacturers in the United States in the month of June is estimated at 34,463 long tons, according to statistics compiled by the Rubber Manufacturers' Association. Consumption during July is estimated to be less than 30,000 tons because of the curtailed activity and shutdowns of manufacturers. Prices on July 26 on No. 1 Standard contract follow:

Position	High	Low	Close	Yesterday's Close
July	....	....	10.67	10.67
Aug.	....	....	10.77	10.77
Sept.	....	....	10.87@10.93	10.87@10.90
Oct.	....	....	11.00	11.00
Nov.	....	....	11.13	11.13
Dec.	....	....	11.26	11.26@11.28
Jan.	....	....	11.42	11.42
Feb.	....	....	11.58	11.58
Mar.	....	....	11.73@11.80	11.73@11.77
Apr.	....	....	11.91	11.91
May	....	....	12.10@12.20	12.10@12.15
June	....	....	12.28	12.28
Spot	....	....	10.75	10.75

New York Quotations

Following are the New York outside market rubber quotations for one year ago, one month ago, and July 26th, the current date

Plantation Hevea	July 25, 1929	June 25, 1930	July 26, 1930
Rubber latex (Hevea)	..gal.$1.50 @	$1.25 @	$1.00 @
Sheet			
Ribbed, smoked, spot	.21 @.21⅛	.12 @	.10¾@.10⅞
August	.21⅛ @.21¼	.12⅛ @	.10⅞ @
August-September	.21⅛ @	.12¾ @.12⅜	.10⅞ @.11
October-December	.22¼ @.22⅜	.12½ @.12¾	.11⅛ @.11⅜
January-March	.22¾ @.23	.13 @.13¼	.11¾ @.11⅞
CREPE			
No. 1 Thin latex (first latex) spot	.22½ @.22¾	.12½ @	.11¼ @.11½
August	.22¾ @	.12¾ @	.11½ @
August-September	.22¾ @.23	.12¾ @.13	.11⅜ @.11½
October-December	.23 @.23¼	.13 @.13⅜	.11¾ @.11⅞
January-March	@	.13½ @.13¾	.12¼ @.12⅜
No. 2 Amber, spot ("B" blanket)	.18¾ @.19	.11½ @	.10¼ @
August	.18⅞ @	.11⅝ @	.10 @.10¼
August-September	.19 @.19¼	.11¾ @.11⅞	.10¼ @.10⅜
October-December	.19¼ @.19¾	.12⅛ @.12¼	.10½ @.10¾
January-March	.19½ @.20	.12½ @.12¾	.11 @.11¼
No. 3 Amber, spot ("C" blanket)	.18⅜ @.18¾	.11¼ @	.09¾ @.10
No. 1 Brown, clean, light, thin	18½ @.18¾	.11½ @	.10¼ @
No. 2 Brown, clean, thin	.18⅛ @.18⅝	.11⅛ @.11¼	.09⅞ @.10
Brown, roll	.14 @.14⅛	.08⅝ @.08¾	.08⅜ @.08½
East Indian			
PONTIANAK			
Banjermasin	.10 @	.08 @	.07 @
Pressed block	.17 @	.13 @	.12½ @.13
Sarawak	.10 @	.08 @	.07 @
South American			
PARAS			
Upriver, fine	.22¾ @	.13½ @	.13 @
Upriver, fine	*.28¾ @	*.18½ @	*.17¾ @
Upriver, coarse	.12 @	.07 @	.06 @
Upriver, coarse	*.19 @	*.12¾ @	*.12 @
Islands, fine	.20½ @	.14½ @	.14 @
Islands, fine	*.28 @	*.18¼ @	*.17½ @
Acre, Bolivian, fine	.23 @	.13¾ @	.13½ @
Acre, Bolivian, fine	*.29½ @	*.18¾ @	*.18 @
Beni, Bolivian	.23½ @	.14 @	.13½ @
Madeira, fine	.22¼ @	.13½ @	.13 @

South American	July 25, 1929	June 25, 1930	July 26, 1930
PARAS—*Continued*			
Peruvian, fine	.$0.21¾@	$0.13 @	$0.12¾@
Tapajos, fine	.21½@	.13 @	.12¾@
CAUCHO			
Upper caucho ball	.12 @	.07 @	.06 @
Upper caucho ball	*.19 @	*.12¾@	*.12 @
Lower caucho ball	.11 @	.06½@	.05½@
Maniçobas			
Ceará negro heads	†.20 @	†.14 @	†.14 @
Ceará scrap	†.12 @	†.08 @	†.08 @
Manicoba, 30% guaranteed	†.22 @	†.16 @	†.16 @
Mangabiera, thin sheet	†.22 @	†.16 @	†.16 @
Centrals			
Central scrap	.11 @.12	.05½@.06½	.05½@.06½
Corinto scrap	.11 @.12	.05½@.06½	.05½@.06½
Esmeralda sausage	11 @.12	@	.05½@.06½
Guayule			
Duro, washed and dried	.19½@	.16½@	.16 @
Ampar	.20½@	.17 @	.17 @
Gutta Percha			
Gutta Siak	.22 @	.15 @	.13½@
Gutta Soh	.29 @	.25 @	.25 @
Red Macassar	2.50 @	2.30 @2.50	2.00 @2.10
Balata			
Block, Ciudad Bolivar	.51 @.52	.41 @	.41 @
Colombia	.45 @.47	.36 @	†.36½@
Manaos block	.56 @.60	.44 @	.44 @
Surinam sheet	.54 @.55	.60 @	.60 @
Amber	.57 @.58	.63 @	.62 @
Chicle			
Honduras	‡.68 @	@	.48 @
Yucatan, fine	‡.68 @	.60 @	.48 @

* Washed and dried crepe. Shipment from Brazil.
† Nominal. ‡ Duty paid.

New York Outside Market (Continued)

	July, 1930					
	21	22	23	24	25	26
Ribbed Smoked Sheet	10⅞	11	10⅞	10⅞	10¾	10¾
No. 1 Thin Latex Crepe	11¼	11⅜	11¼	11¼	11¼	11¼
No. 1 Thick Latex Crepe	10⅞	11	10⅞	10¾	10¾	10¾
No. 1 Brown Crepe	10⅛	10¼	10⅛	10⅛	10⅛	10⅛
No. 2 Brown Crepe	9¾	10	9⅞	9⅞	9⅞	9⅞
No. 2 Amber	10⅛	10¼	10⅛	10⅛	10	10
No. 3 Amber	9⅞	10	9¾	9¾	9¾	9¾
No. 4 Amber	9⅝	9¾	9½	9½	9½	9½
Rolled Brown	8⅜	8½	8⅜	8⅜	8⅜	8⅜

Low and High New York Spot Prices

	July		
PLANTATIONS	1930*	1929	1928
Thin latex crepe	$0.11¼@$0.12¾	$0.21¾@$0.23⅛	$0.18⅝@$0.19⅞
Smoked sheet, ribbed	.10¾@ .12¼	.20⅜@ .22½	.18½@ .19⅝
PARAS			
Upriver, fine	.13 @ .14¼	.21¾@ .22½	.21½@ .23
Upriver, coarse	.06½@ .07¼	.11½@ .12¾	.13¾@ .15
Upper caucho ball	.06½@ .07¼	.11½@ .12¾	.12½@ .14

*Figured to July 26, 1930.

New York Outside Market

Whether it is deserved or not is questionable, but the efforts of the Dutch producers to come to some sort of a restriction agreement have been receiving a good deal of attention. Several meetings were held during the month at Amsterdam, but the proceedings were kept secret until the plan had been submitted to all the producers concerned.

Figures from the automobile and tire industries are not very inspiring. An index computed by the *New York Times* showed a decline of 40.4 points, from 83.3 to 42.9 in the week of July 19, because of suspension by Ford. It clearly shows what a large part of the production of cars is in the cheaper class, which takes cheaper tires. Ford announced only a two weeks' shutdown but later extended it for another week. Reasons were not given.

Manufacturers, generally, have large stocks on hand, owing to their buying on a scale down. With the large stocks still arriving and reduced consumption, it is distinctly a buyers' market, and they are taking advantage of that fact by insisting on the highest possible grades of rubber. It is estimated that consumption for July will not reach 30,000 tons; while shipments out of Malaya to all ports are approximately 45,000 tons.

Week ended June 28: The market showed little inclination to change and moved in a narrow range from 11.70 to 12 cents. Factory inquiry was almost nil, with many of the factories closing for vacations.

So far the reduction due to the May tapping holiday appears to be about 15,000 tons, with expectations that total reduction will not exceed 27,000 tons. With the present market conditions this amount will have almost no effect on the market.

The recent action by producers in setting aside a sum of money for research into new uses for rubber, is a sound expenditure, and over a period of years may show results. Prospects for the next six months are extremely dull, but Moody's investment service believes that the trend of rubber will be upward, while the Henderson Corp. believes that rubber will be one of the first of the commodities to stage a recovery. Closing prices on June 28 were:

Spot	June 28	Month Ago	Year Ago
Crepe	12⅞	14¼	21⅝
Ribs	12½	13⅞	20½
Upriver, fine....	14¼	15½	22¼

Week ended July 5: The market was quiet and sensitive to the slightest of rumors. There was little business, but what was transacted came from the trade. Factory buying was not in evidence.

Inquiry centered in rolled brown crepe and standards. The reason given for the lack of factory demand was that many of the factories are curtailing production in July and closing for inventories and vacations.

A great deal of secrecy seemed to surround the recent meeting of the British and Dutch producers, with all sorts of conjectures and rumors floating around as to what was contemplated. Being almost the only bit of news that was discussed, the rumors blew hot and cold, with traders expecting something drastic.

RUBBER AFLOAT TO THE UNITED STATES

All figures in long tons

Week Ended	British Malaya	Ceylon	Netherland East Indies	London and Liverpool	Total
June 28....	6,732	710	921	10	8,373
July 5.....	5,878	724	1,772	..	8,374
July 12....	6,594	315	1,537	6	8,452
July 19....	4,898	270	1,317	22	6,507
July 26....	5,495	435	1,521	..	7,451

The opinion in London was that an international restriction agreement would be proposed. Another rumor, orginating here, was that the British favored restriction and the Dutch did not. We quote this to show how contrary were the guesses, in the effort to take advantage of any situation that might have developed.

To have any decided effect on the market, however, any agreement reached should, at the same time, make provision for properly enforcing it. Closing prices on July 5 were:

Spot	July 5	Month Ago	Year Ago
Crepe	12½	13⅜	22¼
Ribs	12⅛	12⅞	21¼
Upriver, fine....	14¼	15¾	22¼

Week ended July 12: On July 11 the market took the bit in its teeth and plunged through to new record lows of 10.80 for July. That is the lowest price ever recorded in this country. Absence of any constructive news with reference to restriction and a break in London to what were said to be the lowest quotations for all time were responsible for the breaks of from 36 to 52 points in both contracts.

It was reported in trade circles that the reductions in tire prices instituted on June 5 have done little to stimulate sales. With volume of original equipment business greatly reduced, hope for the industry rested upon a record replacement market. It was estimated at the beginning of the year that the industry would sell more than 50,000,000 tires for replacement in 1930, against 46,000,000 in 1929. Closing prices on July 12 were:

Spot	July 12	Month Ago	Year Ago
Crepe	11⅝	12¾	23
Ribs	11	12⅜	21⅝
Upriver, fine....	14	14½	22½

Week ended July 19: After setting new records for low prices in the previous week, the market sagged further, establishing a new low at 10.60. In the face of uninspiring news and a weak technical position, a continued downward trend seems inevitable.

Factories submitted but limited inquiry, the feeling being that they are fairly well stocked since they have been buying on a scale down. Many plants have reopened after a shutdown for inventories and vacations, but other factories are still scheduled to close. Ford will be idle for the next two weeks. It is anticipated, in the face of the curtailment in operations due to the closing of the various plants, that production for the month will be light.

No official announcement as to the Dutch rubber producers' plans in reference to restrictions will be made until about July 25. It is understood that the meeting consented to approaching the Dutch East Indian government in order to arrive at restriction of estate and native rubber to the extent of 75 per cent of 1929 output until rubber prices reach 9 pence a pound. Whether the government will sanction any such agreement, is a question. Traders are about equally divided in their opinions as to what the government will do.

Consumption figures for June were disappointing, and it is likely that another heavy addition to world stocks will be made at the end of July. Malayan shipments for July are estimated to be 45,000 tons; while consumption in America is estimated to be only 32,000 tons. Goods arriving at the docks here have no buyers and lay waiting for takers. Closing prices on July 19 were:

Spot	July 19	Month Ago	Year Ago
Crepe	11¼	12⅛	22⅛
Ribs	10⅞	11¾	20¾
Upriver, fine....	13½	14⅜	22½

Week ended July 26: Reflecting the lessened factory inquiry, rubber prices were quiet and moderately lower. Old July finished at 10.50 cents.

Slightly better demand should be in evidence in August, coincident with the introduction of new automobile models.

The Dutch restriction agreement was approved by a majority of the producers and submitted to the government for action. Prices on July 26 were:

Spot	July 26	Month Ago	Year Ago
Crepe	11¼	12½	22⅜
Ribs	10¾	12⅜	21⅜
Upriver, fine....	13¼	14¼	22½

Consumption and Stocks

With the exception of 1929, consumption of crude rubber for the first six months of 1930 was the highest on record. The figure, 216,182 long tons, although 19.3 per cent below 1929, was 4.4 per cent above the same period in 1928, 6.8 per cent above 1927, 19.2 per cent above 1926, 7.7 per cent over 1925, 32.3 per cent over 1924, 16.0 per cent over 1923, 88.6 per cent above 1922, and 266.9 per cent above 1921.

Consumption of crude rubber of all classes by manufacturers in the United States in June is estimated at 34,463 long tons, according to the R. M. A. This compares with estimated consumption of 39,902 long tons in May, 43,228 long tons in June, 1929, and 37,676 long tons in June, 1928. While consumption for June was 20.3 per cent below June a year ago and 8.5 per cent below June, 1928, it was 5.8 per cent above the average June consumption for the past eight years.

Imports of crude rubber of all classes into the United States during June totaled 42,653 long tons, according to estimates issued by the R. M. A. This compares with imports of 40,745 long tons in May, 44,490 long tons in June, 1929, and 25,792 long tons in June, 1928.

The association estimates total domestic stocks of crude rubber on hand and in transit overland on June 30 at 151,485 long tons compared with 146,179 long tons as of May 31 and 92,062 long tons as of June 30, 1929. Crude rubber afloat for United States ports on June 30 is estimated at 58,657 long tons as against 68,168 long tons on May 31 and 54,668 long tons a year ago.

Rubber Scrap

NO improvement has occurred during the past month in the rubber scrap trade. Prices are very low and weak. Reductions are noted in certain grades of boots and shoes, inner tubes, and tires; while quotations on most of the list are unchanged, and scrap is moving only at a slow rate. Reclaimers are working up their reserve supplies pending better demand for their product.

BOOTS AND SHOES. Demand is fair for boots and shoes, with prices becoming somewhat easier. Collections are running scanty because present low prices offer no inducement of profit. Consumers' prices on black boots and shoes and on tennis shoes are slightly lower than one month ago.

INNER TUBES. Demand is fairly good for all grades of inner tubes. All grades are quoted unchanged except No. 2 Compounded, the current price of which has declined ¼-cent.

Collectors have noted a diminution in the supply of inner tubes. This is attributed to the uniformly high grade of tires. Tubes used in such tires are highly protected and give longer service.

TIRES. The consuming demand for tires continues to be below normal. The same holds true concerning the supply. Mixed auto tires with beads are quoted at $13.50 to $14 per ton down $1 to $1.50 from the prices of last month. Beadless tires are now $19 to $20 per ton, $1 less than last month.

TRUCK TIRES. The price remains firm and unchanged because of active demand and increasing scarcity of supplies.

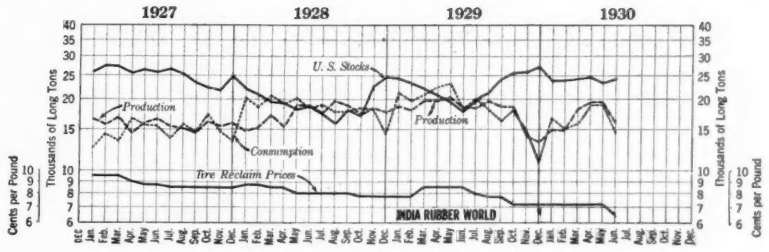
MECHANICALS. Declines in these grades are confined to hose qualities; other grades remain unchanged. Air-brake hose declined $1 per ton, and rubber covered garden hose is off ¼-cent a pound; steam and water hose is down ⅛-cent a pound.

CONSUMERS' BUYING PRICES

Carload Lots

Delivered Eastern Mills
July 28, 1930

	Prices
Boots and Shoes	
Boots and shoes, black..100 *lb.*	$1.10 @$1.15
Untrimmed arctics....100 *lb.*	.70 @ .80
Tennis shoes and soles..100 *lb.*	.60 @ .70
Inner Tubes	
No. 1, floating.....*lb.*	.06⅝@ .06⅞
No. 2, compound.....*lb.*	.02½@ .02¾
Red .....*lb.*	.02¾@ .02⅞
Mixed tubes .....*lb.*	.02⅞@ .03⅛
Tires	
Pneumatic Standard	
Mixed auto tires with beads .....*ton*	13.50 @14.00
Beadless .....*ton*	19.00 @20.00
Auto tire carcass.....*ton*	24.00 @25.00
Black auto peelings....*ton*	24.00 @25.00
Solid	
Clean mixed truck....*ton*	24.50 @25.50
Light gravity .....*ton*	27.00 @29.00
Mechanicals	
Mixed black scrap.....*lb.*	.00¾@ .01
Hose, air brake.....*ton*	14.00 @16.00
Garden, rubber covered..*lb.*	.00⅜@ .00½
Steam and water, soft..*lb.*	.00⅜@ .00½
No. 1 red.....*lb.*	.02 @ .02¼
No. 2 red.....*lb.*	.01 @ .01½
White druggists' sundries..*lb.*	.02 @ .02½
Mechanical .....*lb.*	.01½@ .01⅝
Hard Rubber	
No. 1 hard rubber.....*lb.*	.10 @ .10½



Production, Consumption, Stocks, and Prices of Tire Reclaim

Reclaimed Rubber

THE quotations reported below for the standard type reclaims are the lowest in the history of the rubber reclaiming industry and are by far the most advantageous from the point of view of consumers. Notwithstanding the unprecedentedly low level of crude rubber there is relatively no diminution in the use of reclaim by experienced manufacturers of rubber goods who appreciate fully its compounding value both technically and economically.

Reclaiming, as an integral part of the rubber manufacturing industry, and its products are accepted as compounding ingredients of particular technical benefit as truly as other materials used in compounding rubber mixings.

June production of reclaim was curtailed to correspond with the lower production schedules of tires and automobile manufacturers. Reclaimers are regulating their output of product to demand. The tonnage of stocks, therefore, is not increasing much.

Prices on every grade of reclaim in the list herewith have been reduced, except the lowest quality known as Mechanical Blends, which remains unchanged. This grade is now the only one under the classification, Miscellaneous, Red of 1.35 specific gravity having been discontinued because it was superseded by High Tensile Red of 1.20 specific gravity.

Consumption of reclaimed rubber in the United States is estimated at 14,410 long tons for June, according to statistics compiled by The Rubber Manufacturers' Association. This compares with 17,473 long tons in May, 1930.

New York Quotations

July 28, 1930

High Tensile	Spec. Grav.	Price Per Pound
Super-reclaim, black...	1.20	$0.09¼ @$0.09½
red	1.20	.09 @ .09¼
Auto Tire		
Black	1.21	.06¼ @ .06½
Black selected tires....	1.18	.06½ @ .06¾
Dark gray	1.35	.07¾ @ .08
White	1.40	.09¾ @ .10
Shoe		
Unwashed	1.60	.06½ @ .06¾
Washed	1.50	.08½ @ .08¾
Tube		
No. 1	1.00	.09¾ @ .10
No. 2	1.10	.08¼ @ .08½
Truck Tire		
Truck tire, heavy gravity	1.55	.06¼ @ .06¾
Truck tire, light gravity	1.40	.06½ @ .07
Miscellaneous		
Mechanical blends....	1.60	.05 @ .05¼

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption	Consumption Per Cent to Crude	United States Stocks*.	Exports
1925	132,930	137,105	35.6	13,203	4,571
1926	180,582	164,500	45.9	23,218	5,391
1927	189,144	178,471	47.6	24,980	8,540
1928	208,516	223,000	50.4	24,785	9,577
1929	219,057	224,253	47.9	27,464	12,721
1929					
January	18,685	21,068	49.1	24,394	941
February	18,094	19,829	47.7	23,305	1,028
March	19,984	20,068	46.7	22,076	1,344
April	19,899	21,574	47.3	20,680	1,498
May	20,385	23,176	47.1	19,479	1,299
June	18,416	18,141	42.0	17,980	961
July	18,387	20,236	48.7	19,679	1,202
August	19,787	18,230	47.6	22,309	860
September	18,660	16,416	47.2	24,984	657
October	18,968	18,024	51.8	25,474	830
November	14,363	14,742	53.4	26,080	1,232
December	13,429	11,089	47.1	27,464	869
1930					
January	15,010	16,785	45.8	24,241	954
February	15,847	14,918	45.5	24,241	1,203
March	17,400	15,616	43.2	24,415	1,048
April	17,828	17,321	43.0	24,592	740
May	17,812	17,473	43.7	23,356	939
June	15,745	14,410	41.6	24,484	641

* Stocks on hand the last of the month or year.
Compiled by Rubber Manufacturers Association.

Imports, Consumption, and Stocks

THE topmost of the accompanying graphs represents the closing prices of actual spot-ribbed smoked sheet transactions reported by the Rubber Trade Association of New York. Imports in June were 39,761 tons, an increase of 1,971 tons over May figures. In June, however, consumption was 34,643 tons, or 5,259 tons lower than in May, thus substantiating the possibility suggested in this department last month that the peak consumption of the first six months of the current year had already occurred in April. Tire production, which is by far the largest factor in consumption, did not increase in June.

Henderson Rubber Reports, Inc., estimates July consumption at 30,000 tons, which is 4,643 tons below the actual reported for June. The same authority estimates July imports at 37,500 tons, stocks afloat as of July 31 to the United States at 55,000 tons, and stocks on hand in the United States at 157,000 tons.

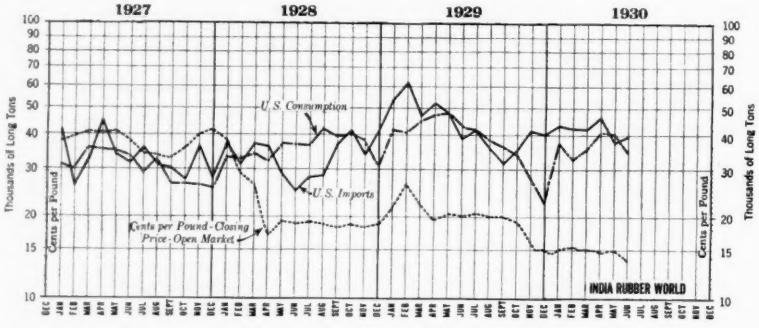
The curve of closing spot prices in the open market, which averaged around 15 cents for the first 5 months, declined in June to 12 cents, fell off to 11 cents in July with indications of weakness suggesting that the bottom price may not yet have been reached.

United States stocks of crude rubber on hand and afloat, also the combined London, Liverpool, Singapore, and Penang stocks are shown by the curves on the lower chart.

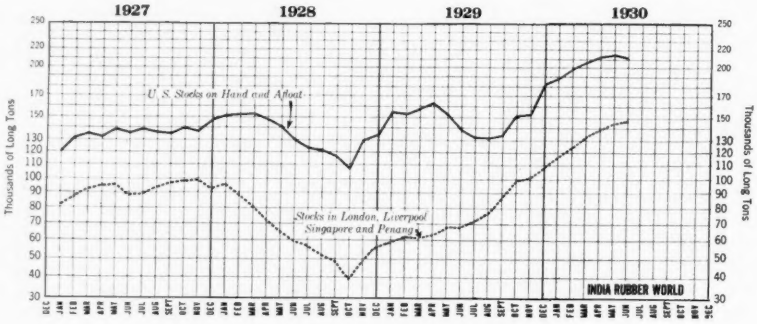
Consumption of rubber in the United States for the first half of 1930 was 220,061 tons. The present outlook does not indicate that 1930 consumption will equal 1928, which is considered a normal year.

London stocks between June 21 and July 26 increased by 1,957 tons. The weekly record is as follows: June 28, 79,699 tons; July 5, 80,060 tons; July 12, 80,501 tons; July 19, 80,814 tons; July 26, 80,845 tons.

Liverpool stocks also advanced in the same interval by 1,027 tons. The weekly record of Liverpool stocks is: June 28, 27,493 tons; July 5, 28,143 tons; July 12, 28,226 tons; July 19, 28,126 tons; July 26, 28,381 tons.



United States Imports, Consumption, and Prices of Ribbed Smoked Sheets



United States, British and Malayan Rubber Stocks

United States Statistics of Rubber Imports, Consumption, and Stocks

Twelve Months	*Net Imports Tons	Consumption Tons	Stocks on Hand Tons	Stocks Afloat Tons	Total Domestic Stocks Tons	British and Malayan Stocks: London & Liverpool Tons	British and Malayan Stocks: Singapore & Penang Tons	British and Malayan Stocks: Total Tons
1925	385,596	388,000	50,985	52,421	103,406	6,328	18,840	25,168
1926	399,972	366,000	72,510	51,238	123,748	51,320	26,443	77,763
1927	403,472	373,000	100,130	47,938	148,068	66,261	25,798	92,059
1928	407,572	437,000	66,166	68,764	134,930	22,603	32,905	55,508
1929	527,327	464,644	105,138	62,389	167,527	73,253	35,548	108,801
1930								
January	44,093	36,669	126,068	61,863	187,931	81,300	33,468	114,768
February	41,373	32,726	134,790	63,404	198,194	87,100	37,550	124,650
March	42,339	35,914	141,843	63,646	205,489	93,500	38,129	131,629
April	46,997	40,207	148,272	63,261	211,533	99,870	39,880	139,750
May	37,790	39,902	146,179	68,168	214,347	102,936	41,253	144,189
June	39,761	34,643	151,551	58,658	210,209	108,203	39,033	147,236

*Including liquid latex, but not guayule.

United States Crude and Waste Rubber Imports for 1930 by Months

	Plantations	Latex	Paras	Africans	Centrals	Guayule	Manicobas and Matto Grosso	Total 1930	Total 1929	Balata	Miscellaneous	Waste
January ..... tons	46,042	362	747	76	10	125	...	47,362	52,305	127	748	35
February	42,510	275	788	66	14	75	...	43,728	64,538	130	543	144
March	44,002	332	894	37	15	150	...	45,430	53,824	123	738	20
April	48,727	179	881	53	12	75	...	49,927	54,171	87	628	107
May	39,620	444	530	..	1	150	...	40,745	49,180	109	909	87
June	41,631	314	492	..	128	88	...	42,653	44,490	127	829	2
Total, six months, 1930 ..... tons	262,532	1,906	4,332	232	180	663	...	269,845	.....	703	4,395	395
Total, six months, 1929 ..... tons	*311,223	...	6,651	211	192	218	13	.....	318,508	498	6,786	1,624

* Latex included.
Compiled from Rubber Manufacturers Association statistics.

Compounding Ingredients

THE demand for all compounding ingredients by the rubber industry has been slow, steady, and moderate in amount. Tire production in the Akron section is reported less active than one month ago when it was reported at 65 per cent of capacity. In other fields of rubber goods production output is on a fair seasonal basis.

Although the consumption of compounding ingredients in general for July is probably at the lowest for this year, the outlook is considered favorable for better demand in the rest of the second half year.

ACCELERATORS. Trade in the more popular brands of accelerators is well sustained. These materials are established essentials in rubber manufacturing practice, and since the deflation of accelerator prices some years ago, their use steadily has increased. The tendency among compounders is to standardize on those accelerators that seem best adapted for special types of goods or cure; this accounts for the divergent trends followed by individual accelerators.

ANTIOXIDANTS. These materials, like accelerators, occupy a basicly sound position in rubber technology by functioning to preserve the life of rubber goods by minimizing their deterioration. Discrimination is necessary to obtain the best results in a given line of goods as individual antioxidants are differentiated as to chemical effect. The use of antioxidants is recognized as profitable even in cheap lines of rubber goods.

CARBON BLACK. Carbon black prices are now at bottom levels and are an encouragement for firm buying during the next few months. The real competition of the soft carbon grades is reclaimed rubber. With the new prices now in effect soft carbons will come into much wider use in practically all lines of rubber goods because they give improved processing and increase resistance to tearing and abrasion at equal cost.

CLAY. This inexpensive reenforcing material holds its relative position in the steady moderate demand for compounding ingredients.

LITHARGE. The price was reduced ¼-cent a pound effective June 23. The demand is steady and never excessive for official statistics show that the average monthly consumption of litharge in the record year 1929 was 550 tons.

LITHOPONE. Prices remain steady and unchanged. Demand is fairly active by the rubber trade, which uses an average of 598 tons of lithopone each month.

MINERAL RUBBER. This material has become so competitive that most of this business is now annexed by the oil companies at extremely low prices. Many rubber companies use the cheaper grades of MR regardless of quality, more especially in competitive and unstandardized goods. Tire manufacturers have too much at stake to favor this practice.

SOFTENERS. In general the popular softeners are in fair and steady demand. Degras has recovered the slackness felt by the business early in the month. Stearic acid early in July declined ½-cent a pound. This was followed by better business with steady tone in prices.

V. M. P. NAPHTHA. Reduced and spotty demand characterized the business during July. Prices are firm.

ZINC OXIDE. This material is meeting with improved business in the rubber trade. Sellers continue to hold their prices firm at established levels.

New York Quotations

July 28, 1930

Abrasives

Marble flour	ton	$25.00 @	$30.00
Pumice stone, pwd.	lb.	.02½ @	.04
Rottenstone, domestic	ton	23.50 @	28.00
Rottenstone, English	lb.	.04 @	.05
Silica	lb.	.01¼ @	.05

Accelerators, Inorganic

Lead, carbonate	lb.	.07¾ @	
red	lb.	.08¾ @	
sublimed blue	lb.	.07¼ @	
sublimed white	lb.	.07¼ @	
super-sublimed white	lb.	.07¼ @	
Lime flour, hydrated	ton	20.00 @	35.00
Litharge	lb.	.07¾ @	
Magnesia, calcined, heavy	lb.	.04 @	
carbonate	lb.	.06 @	.07
Orange mineral A.A.A.	lb.	.10¾ @	

Accelerators, Organic

A-1	lb.	.22 @	.27
A-5-10	lb.	.31 @	.36
A-7	lb.	.55 @	.65
A-11	lb.	.62 @	.75
A-16	lb.	.57 @	.65
A-19	lb.	.58 @	.75
A-20	lb.	.64 @	.80
A-32	lb.	.70 @	.80
Accelerator 49	lb.	@	
Aldehyde ammonia	lb.	@	
Anhydro formaldehyde aniline	lb.	@	
Barak	lb.	@	
Butene	lb.	@	
Captax	lb.	@	
Crylene	lb.	@	
paste	lb.	@	
D. B. A.	lb.	@	
D. O. T. G.	lb.	@	
D. P. G.	lb.	.30 @	.35
Ethylidine aniline	lb.	@	
Heptene	lb.	@	
base	lb.	@	
Hexamethylenetramine	lb.	@	
Lead oleate, No. 999	lb.	.14 @	
Witco	lb.	.13 @	
Lithex	lb.	@	
Methylene dianiline	lb.	@	
Monex	lb.	@	
Phenex	lb.	.70 @	.75
Pinsol	lb.	4.00 @	4.50
Plastone	lb.	@	
R-2	lb.	1.75 @	2.15
base	lb.	4.50 @	5.00
R & H 40	lb.	@	
50	lb.	@	
Safex	lb.	@	
S-P-D-X	lb.	.70 @	.75
Super-sulphur No. 1	lb.	@	
No. 2	lb.	@	
Tensilac 39	lb.	@	
Thermlo F	lb.	@	
Thiocarbanilid	lb.	@	
Trimene	lb.	@	
base	lb.	@	
Tuads	lb.	@	
Ureka	lb.	$0.70 @	$1.00
V. G. B.	lb.	@	
Waxene	lb.	.30 @	.40
Z. B. X.	lb.	@	
Z-88	lb.	.50 @	.60
Zimate	lb.	@	

Acids

Acetic 28% (bbls.)	100 lbs.	3.11 @	3.36
glacial (carboys)	100 lbs.	11.51 @	11.76
Sulphuric, 66°	ton	15.50 @	

Alkalies

Caustic soda, 76% solid	100 lbs.	2.90 @	3.00

Antioxidants

Age-Rite, powder	lb.	@	
resin	lb.	@	
white	lb.	@	
Albasan	lb.	@	
Antox	lb.	@	
Oxynone	lb.	.68 @	.90
Resistox	lb.	.54 @	.65
Stabilite	lb.	.57 @	.62
Alba	lb.	.70 @	75
Zalba	lb.	@	

Antisun Materials

Helizone	lb.	@	
Sunproof	lb.	@	

Binders, Fibrous

Cotton flock, dark	lb.	.09½ @	.10½
dyed	lb.	.50 @	.85
white	lb.	.11 @	.25

Colors

BLACK

Bone	lb.	.09½ @	
Carbon (see Reenforcers)			
Drop (bbls.)	lb.	.05½ @	.15
Lampblack (commercial)	lb.	.07 @	.08

Colors *(Continued)*

BLUE

Huber, brilliant	lb.	$3.50 @	$4.00
Prussian	lb.	.35 @	.37
Ultramarine	lb.	.06 @	.30

BROWN

Huber, mocha	lb.	1.60 @	2.10
Iron oxide	lb.	.03 @	.15
Mapico	lb.	.17	
Sienna, Italian, raw	lb.	.05½ @	.12½

GREEN

Chrome, light	lb.	.27 @	.31
medium	lb.	.28 @	.31
Chromium oxide	lb.	.33 @	.34
Huber, brilliant	lb.	3.75 @	4.25

ORANGE

Huber, Persian	lb.	.50 @	1.00

RED

Antimony Crimson, R. M. P. No. 3	lb.	.48 @	
Sulphur, free	lb.	.52 @	
7-A	lb.	.35 @	
Sulphuret, golden No. 60	lb.	@	
Z-2	lb.	.22 @	
Cadmium	lb.	1.15 @	
Huber, brilliant	lb.	1.35 @	1.85
Iron Oxides			
bright pure domestic	lb.	.10½ @	
bright pure English	lb.	.14 @	
bright reduced English	lb.	.10 @	
bright reduced domestic	lb.	.08½ @	
Indian (maroon), pure domestic	lb.	.10½ @	
Indian (maroon), pure English	lb.	.11 @	
Indian (maroon) reduced English	lb.	.09½ @	
Indian (maroon) reduced domestic	lb.	.08½ @	
Mapico	lb.	.10½ @	
Oximony	lb.	.13¼ @	
Spanish red oxide	lb.	.03 @	.04
Sunburnt red	lb.	.14 @	
Venetian red	lb.	.01¾ @	.05

WHITE

Lithopone	lb.	.05½ @	.05¾
Albalith	lb.	.05¼ @	.05½
Azolith	lb.	.05¼ @	.05¾
Cryptone	lb.	.07¼ @	.07½
Grasselli (50 lb. bags)	lb.	.05½ @	.05½
(400 lb. bbls.)	lb.	.05½ @	.05¾

Colors—*(Continued)*

WHITE—*(Continued)*

Titanium oxide, pure	lb.	$0.20 @	$0.22
Titanox "B"	lb.	.07¼ @	.07½
"C"	lb.	.07¾ @	.08

Zinc Oxide

AAA (lead free) (bbls.)	lb.	.07 @	
Azo (factory):			
ZZZ (lead free)	lb.	.06½ @	.07
ZZ (leaded)	lb.	.06¾ @	.06¾
Z (8% leaded)	lb.	.06½ @	.06¾
Green seal	lb.	.10¾ @	.10⅞
Kadox, black label	lb.	.10⅜ @	.10⅝
blue label	lb.	.09⅜ @	.09⅝
red label	lb.	.08 @	.08¼
Red seal	lb.	.09¾ @	.09⅞
Special	lb.	.07 @	.07¼
White seal	lb.	.11⅜ @	.11⅞
XX green	lb.	.07 @	.07¾
XX red	lb.	.06½ @	.06¾
Zinc sulphide	lb.	.16 @	.16¼

YELLOW

Cadmium sulphide	lb.	.65 @	1.40
Chrome	lb.	.17 @	.17½
Huber, canary	lb.	2.80 @	3.30
Mapico	lb.	.12 @	
Ochre, domestic	lb.	.01⅝ @	.02½
French	lb.	.03 @	
Oxide, pure	lb.	.09 @	
Zinc, C. P., imported	lb.	.21 @	

Factice—See Rubber Substitutes

Fillers for Pliability

Flex	lb.	@	
Fumonex	lb.	.04 @	.08
P-33	lb.	@	
Thermax	lb.	@	
Velvetex	lb.	.03 @	.06

Fillers, Ordinary

Asbestine	ton	13.40 @	13.50
Baryta white (f.o.b. St. Louis, bbls.)	ton	23.00 @	
(f.o.b. St. Louis, paper bags)	ton	22.20 @	
Barytes, pure white	ton	35.00 @	40.00
off color	ton	@	
medium	ton	@	
Foam "A" (f.o.b. St. Louis, bbls. and bags)	ton	23.00 @	
Basofor	lb.	.04½ @	
Blanc fixe, dry	lb.	.04½ @	
pulp	ton	42.50 @	45.00
Infusorial earth	ton	40.00 @	
Slate flour, gray (fact'y)	ton	7.00 @	

Whiting

Domestic	100 lbs.	1.00 @	
English cliffstone	100 lbs.	1.50 @	
Imported chalk	100 lbs.	.95 @	1.50
Paris White, English cliffstone	100 lbs.	1.50 @	3.50
Quaker	ton	@	
Sussex	ton	@	
Witco (I. c. l.) (f.o.b. New York)	ton	18.00 @	

Finishes

Mica, amber	lb.	.04½ @	
Shellac, fine orange	lb.	.60 @	
Starch, corn, pwd.	100 lbs.	3.62 @	3.82
potato	lb.	.05½ @	.06
Talc, domestic	lb.	.01¼ @	
dusting	lb.	.01½ @	.04
French	ton	18.00 @	22.00
Pyrax A	ton	@	

Inflating Material

Ammonium carb., pwd.	lb.	.10 @	.11
lump	lb.	.09½ @	.10½

New York Quotations

July 28, 1930

Mineral Rubber

Fluxrite (solid)	lb.	@	
Genasco (fact'y)	ton	$40.00 @	$42.00
Gilsonite (fact'y)	ton	37.14 @	39.65
Granulated M. R.	ton	@	
Hydrocarbon, hard	ton	@	
Ohmlac Kapak, M. R. (f.o.b. fact'y)	ton	60.00 @	
M. 4 (f.o.b. fact'y)	ton	175.00 @	
Paradura (fact'y)	ton	62.50 @	65.00
Parmr Grade 1	ton	28.00 @	
Grade 2	ton	28.00 @	
Pioneer, M. R., solid fact'y	ton	40.00 @	42.00
M. R. granulated	ton	50.00 @	52.00
Robertson, M. R., solid (fact'y)	ton	34.00 @	80.00
M. R. granulated	ton	38.00 @	80.00

Mold Lubricants

Rusco mold paste	lb.	.12 @	.30
Soapbark (cut)	lb.	.10 @	.11
Soapstone	ton	15.60 @	22.00

Oils

Kerosene	gal.	.11½ @	
Mineral	gal.	.20 @	
Poppy seed oil	gal.	1.70 @	
Rapeseed	gal.	.68 @	
Red oil, distilled	lb.	.09⅛ @	.09⅝
Rubber process	gal.	.25 @	
Spindle	gal.	.30 @	

Reenforcers

Aluminum flake (sacks, c.l.)	ton	21.85 @	
(sacks, l.c.l.)	ton	24.50 @	
Carbon Black			
Aerfloted arrow	lb.	.05 @	.10
Century (works, La., c. l.)	100 lbs.	4.60 @	
Disperso (works, La., c. l.)	100 lbs.	4.60 @	
Excello	lb.	.05 @	
Gastex (f.o.b. fact'y)			
contracts	lb.	.04 @	
carload	lb.	.04 @	
less carload	lb.	.06½ @	.07½
Micronex	lb.	.05 @	.10
Ordinary (compressed or uncompressed)	lb.	.04½ @	.09
Palmer gas black	lb.	@	
Supreme	lb.	.05 @	
Clays			
Bento	lb.	.02½ @	.03
Blue Ridge, dark	ton	@	
China	lb.	.01¼ @	
Dixie	ton	@	
Dusto	lb.	.05 @	.07
Langford	ton	@	
Lexo (works)	ton	8.00 @	
Par	ton	@	
Perfection	ton	25.00 @	
Suprex	ton	8.00 @	20.00
Glue, high grade	lb.	.25 @	.35

Rubber Substitutes or Factice

Black	lb.	.08 @	.13
Brown	lb.	.08 @	.14
White	lb.	.09 @	.15

Softeners

Burgundy pitch	100 lbs.	5.00 @	7.00
Atlas	100 lbs.	6.50 @	
Corn oil, crude	lb.	.09½ @	
Cottonseed oil (P. S. Y.)	lb.	.09½ @	
Coumarone resins	lb.	@	
Cycline oil	lb.	.25 @	.34
Degras	lb.	.03¾ @	.04½

Softeners *(Continued)*

Fluxol	ton	$18.00 @	$80.00
Fluxrite (fluid)	lb.	@	
Laurex, ton lots	lb.	@	
Palm oil (Lagos)	lb.	.07 @	
(Niger)	lb.	.06¾ @	
(Witco)	lb.	.08 @	
Para-flux	gal.	.15 @	17
Petrolatum, snow white	lb.	.08 @	.08¾
Pigmentar	gal.	.16 @	.21
Pigmentaroil (tank cars, factory)	gal.	.15 @	
(bbls. drums)	gal.	.20 @	
Pine oil, dest distilled	gal.	.50 @	.55
Pine pitch	bbl.	7.00 @	8.00
Pine tar (retort)	gal.	.28 @	
Rosin K (bbls.)	280 lbs.	5.80 @	
Rosin oil compounded	gal.	.35 @	
No. 3, deodorized	gal.	.57 @	
No. 556, deodorized	gal.	.48 @	
Rubberseed, drums	lb.	@	
Rubtack	lb.	.10 @	
Stearex	lb.	.13 @	.18
Stearic acid, double pressed	lb.	.13½ @	.14
Tackol	lb.	.09 @	.18
Tonox	lb.	@	
Witco No. 20	gal.	.17 @	
Woburn oil	lb.	.05½ @	.06
Wobonite No. 94	lb.	.03½ @	

Solvents

Benzol (90% drums)	gal.	.26 @	
Carbon bisulphide (drums)	lb.	.05½ @	.12
tetrachloride (drums)	lb.	.06½ @	.12
Dip-Sol	gal.	.13 @	
Dryolene, No. 9	gal.	.09½ @	
Gasoline			
No. 303			
Drums, c. l.	gal.	.20 @	
Tankcars	gal.	.16 @	
Rub-Sol	gal.	.08½ @	
Solvent naphtha (tanks)	gal.	.28 @	
Stod-Sol	gal.	.09 @	
Turpentine, Venice	lb.	.20 @	
dest distilled	gal.	.33 @	.34

Vulcanizing Ingredients

Sulphur			
Rubber sulphur	100 lbs.	@	
Soft rubber (c.l.)	100 lbs.	@	
(l.c.l.)	100 lbs.	@	
Sulphur chloride	lb.	.03½ @	.04
Superfine commercial flour (bbls.)	100 lbs.	2.55 @	3.10
(bags)	100 lbs.	2.20 @	2.80
Tire brand, superfine, 100 lbs.		1.75 @	
Tube brand, velvet	100 lbs.	2.30 @	
Velvet flour (240 lb. bbls.)	100 lbs.	2.95 @	3.50
(150 lb. bags)	100 lbs.	2.60 @	3.15
Vandex	lb.	@	

(See also Colors—Antimony)

Waxes

Beeswax, white, commercial	lb.	.55 @	
carnauba	lb.	.33 @	
ceresin, white	lb.	.12½ @	
montan	lb.	.06½ @	
ozokerite, black	lb.	.28 @	
green	lb.	.28 @	

Paraffin

122/124 crude, white scale	lb.	.03¼ @	
124/126 crude, white scale	lb.	.03¼ @	
125/127 fully refined	lb.	.04¼ @	

Miscellaneous Supplies

Bentonite (dispersion clay)	lb.	.02½ @	.03
Sponge paste	lb.	.30 @	

PUTNAM BALLOON TIRE PATENT INVALID

BALLOON TIRES. Steel Wheel Corp. vs. B. F. Goodrich Rubber Co. No. 5362. The United States Circuit Court of Appeals for the Sixth Circuit has upheld the ruling that claims 1 and 2 of the Putnam patent for so-called balloon tires are invalid, sustaining the District Court for the Eastern District of Michigan (III. *U. S. Daily*, 1278).

The opinion of Judge Hickenlooper states there was nothing new in the balloon tire as a tire and is quoted in part as follows:

"The airplane tires in common use long before Putnam's application date answer every call of the claims, increase in cross-sectional area and decrease in ratio of wall thickness below that of other commonly used tires of the same size." The court held that there are no broad generic differences between "balloon" tires and "high pressure" tires.

The opinion concludes, "The contribution of Putnam to the art lay altogether in persuading the automobile, tire, and rim industries to adopt his ideas as to size of tires."

New York Quotations

July 28, 1930

Drills

38-inch 2.00-yard	*yard*	$0.14 @
40-inch 3.47-yard		.08¼ @
50-inch 1.52-yard		.18⅜ @
52-inch 1.90-yard		.15 @
52-inch 2.20-yard		.13 @
52-inch 1.85-yard		.15⅛ @

Ducks

38-inch 2.00-yard D. F.	*yard*	.15 @
40-inch 1.45-yard S. F.		.20⅝ @
72-inch 1.05-yard D. F.		.30½ @
72-inch 16.66-ounce		.32¼ @
72-inch 17.21-ounce		.33⅜ @

MECHANICAL

Hose and belting	*pound*	.30 @

TENNIS

52-inch 1.35 yard	*yard*	.22⅛ @

Hollands

RED SEAL

36-inch	*yard*	.14 @
40-inch		.15 @
50-inch		.19½ @

GOLD SEAL

40-inch, No. 72	*yard*	.18½ @
40-inch, No. 80		.19½ @

Osnaburgs

40-inch 2.35-yard	*yard*	.12⅜ @
40-inch 2.48-yard		.11⅝ @
40-inch 3.00-yard		.09⅞ @
40-inch 10-oz. part waste		.15 @
40-inch 7-oz.		.10 @
37-inch 2.42-yard		.12 @

Raincoat Fabrics

COTTON

Bombazine 64 x 60	*yard*	.10 @
Bombazine 60 x 48		.09 @
Plaids 60 x 48		.10¾ @
Plaids 48 x 48		.12 @
Surface prints 64 x 60		.12½ @
Surface prints 60 x 48		.11 @
Print cloth, 38½-in., 60 x 48		.04½ @
Print cloth 38½-in., 64 x 60		.05½ @

Sheetings, 40-inch

48 x 48, 2.50-yard	*yard*	.09⅞ @
48 x 48, 2.85-yard		.08½ @
64 x 68, 3.15-yard		.09¼ @
56 x 60, 3.60-yard		.08 @
44 x 48, 3.75-yard		.07 @
44 x 40, 4.25-yard		.06⅛ @

Sheetings, 36-inch

48 x 48, 5.00-yard	*yard*	.05½ @
44 x 40, 6.15-yard		.04½ @

Tire Fabrics

SQUARE WOVEN 17¼-ounce

Peeler, karded	*pound*	.40 @

BUILDER 23/11

Peeler, karded	*pound*	.40 @

BUILDER 10/5

Peeler, karded	*pound*	.37 @

CORD 23/5/3

Peeler, karded	*pound*	.40 @

CORD 23/4/3

Peeler, karded	*pound*	.42 @

CORD 23/3/3

Peeler, karded	*pound*	.45 @

CORD 15/3/5

Peeler, karded	*pound*	.38 @

CORD 13/3/3

Peeler, karded	*pound*	.37 @

LENO BREAKER

8-oz. Peeler, karded	*pound*	.40 @
10-oz. Peeler, karded		.40 @

CHAFER

9.5-oz. Peeler, karded	*pound*	.43 @
12-oz. Peeler, karded		.42 @
14-oz. Peeler, karded		.40 @

Cotton and Fabrics

MARKETING the cotton crop begins on August 1 and it is hoped that the uncertainty as to the loaning policy of the Farm Board will soon be dispelled. Final determination of the amount to be loaned has not been made, but Carl Williams of the board has stated that the board will lend "not less than 65 per cent of the market value of cotton." He also stated that the cooperatives may be expected to advance to their members the largest possible amount consistent with safety.

COTTON BULL POINTS

1. Progress is being made to adjust output with current demand.
2. A movement of almost revolutionary proportions is taking place in the development of textile machinery, reducing costs and increasing manufacturing flexibility.
3. Many basic constructive developments should be born of the present exigencies of the cotton goods industry.
4. Extreme drought, unless relieved, will materially cut output.

COTTON BEAR POINTS

1. New domestic crop and carryover will be well in excess of probable needs as indicated by the present rate of world consumption.
2. America no longer holds a monopoly in cotton, and foreign spinners are registering an increasing preference for other growths.
3. American Cotton Textile Merchants of New York report sales for June of only 129,900,000 yards, a decline of 43 per cent from June, 1929, and lowest volume since figures have been compiled. Output was 199,000,000 yards against 286,000,000 in June, 1929, and 288,000,000 in June, 1928.
4. Sales are on the decline in spite of price-cuts.
5. Cotton goods are at a relatively greater price disadvantage with silk and rayon than ever before.
6. Uncertainty exists over the future policy of the Farm Board.
7. Consumption of American cotton for season ended July 31 next, is estimated by American Cotton Exchange Service at 13,400,000 bales, a reduction of 2,000,000 bales or 13 per cent from average consumption of past three seasons. Carryover is estimated to be 5,800,000 bales.
8. Prices are at lowest level since early 1927. Goods prices are very poor, operating margins reduced, and sales low.
9. Shipments for June were 92 per cent of production; sales were 65.5 per cent of production; stocks on hand increased 3.5 per cent in June; and unfilled orders declined 19.4 per cent for June.

The Department of Agriculture reported that the world's visible supply of cotton on June 27 was about 1,500,000 bales above the supply a year previous and was the largest for that date since 1921. Exports up to June 27 were about 1,300,000 bales below last year. Spinners' takings of American cotton from August 1, 1929, to June 27, 1930, were 2,251,000 bales less than for the similar period the previous season.

The drought which cotton has suffered for the last few weeks has been relieved in a few areas, but concern is still felt about the final effects of the dry weather.

Week ended June 28: Prenotice day liquidation unsettled the market somewhat early in the week; the notices were promptly stopped by brokers acting for the cooperatives. On the 25th cotton dropped to a new low of 13 cents for July, but it closed the week at 13.59 to 13.60.

Temperatures were reported at 100° F. and more throughout a large part of the belt, and the crop was declared to be in a good condition. It was pointed out, however, that the crop usually shows up best in the month of June, and an opportunity still exists for almost anything to happen.

The market closed firm for the week. The continued hot weather helped to keep the price up, but brokers were cautious about making commitments in the fear that showers might develop.

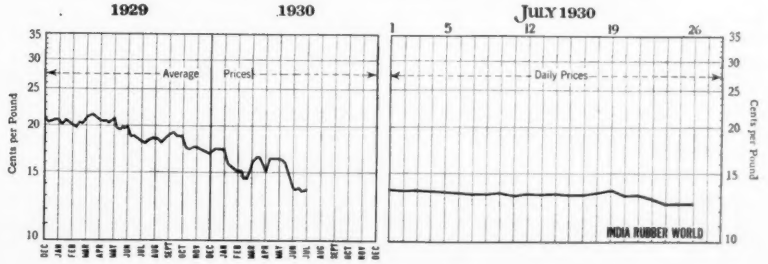
Foreign news was generally discouraging. Advices from Japan indicated that the textile depression has been increased by fear that the 1,000,000 bales held by the Federal Farm Board may affect raw material prices later on.

The market at Bombay was erratic and fluctuated widely because of political disturbances. China had no good news to offer, and yarns are inactive. Conditions at Manchester prompted a meeting reported by the *Wall Street Journal* as follows:

"A meeting at Manchester of spinners in the section spinning Egyptian cotton instructed a committee to prepare a scheme of rationalization in order to prevent losses. The scheme includes measures for price fixing and for curtailment of output. Members running more than an average time would make payments into a pool, and those working machinery at less time would receive the payments. A company will be formed to carry out the plan. Support of 90 per cent of the spinners is required to put the plan into operation. All of the big combines among the Egyptian mills are supporting the scheme."

The same strenuous efforts are being made by spinners in the South to curtail

Daily Prices of Spot Middling Upland Cotton



production. While they are succeeding to some extent, production is still in excess of sales. For the month of May excessive production was again reported. Prices on June 28 were:

Position	High	Low	Close	Yesterday's Close
July	13.60	13.50	13.59	13.52
Oct.	13.31	13.19	13.28	13.21/22
Oct.	13.06	12.92	13.02	12.95
Dec.	13.45	13.36	13.47	13.38
Dec.	13.22	13.08	13.20	13.11/12
Jan.	13.43	13.40	13.51	13.43
Jan.	13.26	13.13	13.25/26	13.18
Mar.	13.45	13.37	13.45	13.39/40

Week ended July 5: The hot, dry weather continued in most of the cotton belt and was responsible for whatever unsteadiness the market displayed. The market dragged on the final day of the week in face of the long holiday and the fact that beneficial rains were predicted over the areas that had been suffering under extreme heat. Good rains at this time would be just what the crop needed. Continued drought would, however, bolster the declining prices of staple because of the large amount of cotton already on hand.

About 150,000 bales of cotton were delivered against tenders for July contracts, making a total of 750,000 bales for May and July, which is by far the largest quantity of cotton ever taken up by any interest on the exchange, according to Harriss & Vose.

What the Stabilization Corp. is going to do with the large amount of cotton it now has on hand, is causing concern to many traders. Thus far, by taking the surplus out of the market, it has kept the price on futures about a cent higher than it would ordinarily have been.

Prices at Liverpool closed the week in a dull state and did not meet the advance that occurred in our market on Wednesday. Prices on July 3 follow:

Position	High	Low	Close	Yesterday's Close
July	13.50	13.40	13.49/50	13.50/52
Oct.	13.33	13.26	13.26	13.39
Oct.	13.07	12.98	13.01	13.11/13
Dec.	13.46	13.40	13.40	13.54
Dec.	13.22	13.14	13.16	13.29
Jan.	13.52	13.43	13.43	13.56
Jan.	13.29	13.22	13.22/24	13.34/37
Mar.	13.47	13.39	13.39/40	13.50/54

Week ended July 12: The market broke on Monday in anticipation of the acreage report published by the Department of Agriculture on July 8. The figures placed the cotton crop acreage at 45,815,000, or 97 per cent of the 47,067,000 acres in 1929. This estimate, slightly less than the average of private estimates, induced some selling.

Although the price of cotton declined $1 a bale immediately after the figures of the department were made known, a brisk rally in the afternoon wiped out the early decline. The extremely hot weather prevailing in most of the cotton belt completely overshadowed the report.

"Should the present dry conditions continue in the central belt," the opinion of Pynchon & Co. is "a covering move is likely to develop."

The annual custom of auctioning the first bale of the 1930 crop was observed by the New York Cotton Exchange with the usual ceremonies. With spirited bidding the first arrival brought $1,000. The proceeds have been donated to the Disabled American War Veterans, and the bales have been auctioned in Corpus Christi where the successful bidder also donated the proceeds. It will next be auctioned in Liverpool for the benefit of the British veterans. Prices on July 12 were:

WEEKLY AVERAGE PRICES OF MIDDLING COTTON

Week Ended	Cents per Pound
June 28	13.55
July 5	13.60
July 12	13.20
July 19	13.27
July 26	12.92

Position	High	Low	Close	Yesterday's Close
July	13.03	12.90	13.00	12.90/91
Oct.	13.07	12.95	13.07	12.97
Oct.	12.79	12.66	12.78/79	12.66/67
Dec. ...	13.22	13.08	13.22	13.12
Dec.	12.96	12.83	12.95/96	12.87/88
Jan.	13.15	13.15	13.22	13.13
Jan.	13.00	12.88	12.99/13.00	12.92/93
Mar.	13.21	13.07	13.19	13.15

Week ended July 19: Apprehension over dry weather conditions caused the shorts to cover on Friday, and cotton closed at gains of $1.25 over the previous close. October cotton early in the week, however, was forced to new low levels partly because of the weather and partly in sympathy with the price of wheat, which hit the lowest level in fourteen years.

Bureau of the Census reported 405,181 running bales of lint cotton consumed in the mills of the United States in June, against 473,917 in May, and 569,414 in June, 1929. Total consumption for the eleven months ended June 30 amounted to 5,735,097 bales, against 6,543,900 in the corresponding period of 1928-29 season. Spindles active during June numbered 27,642,158, compared with 23,374,434 in May, and 30,631,800 in June, 1929. Prices on July 19 were:

Position	High	Low	Close	Yesterday's Close
July	13.43	13.26	13.43	13.18
Oct.	13.58	13.46	13.58	13.40/41
Oct.	13.33	13.18	13.31/33	13.15/16
Dec.	13.72	13.64	13.74	13.58
Dec.	13.50	13.39	13.49/50	13.34/36
Jan.	13.72	13.68	13.76	13.60
Jan.	13.56	13.47	13.56	13.41
Mar.	13.75	13.65	13.73/75	13.60

Week ended July 26: The sky ruled the market, and cotton prices advanced and receded with predictions of rain. Early in the week rain fell on some of the affected area, but futures held firm because of doubt as to whether the rain was heavy enough to relieve the drought. Later the failure of bullish factors to stage a rally induced the bears to sell short. On Friday a strong market developed as these shorts were driven to cover. July sold off to 12.32 cents but went off the board at midday, at 12.43 cents.

Drought has been only partially relieved. From July 21 to 25 five out of twenty-eight stations in Arkansas received rain, while in Mississippi only eight out of twenty, and in Alabama only nine out of twenty-one of the districts reported receiving over an inch of rain. It is still felt that more abundant rains are needed in the central and western belts. Prices on July 26 were:

Position	High	Low	Close	Yesterday's Close
Oct.	13.09	12.90	13.05	12.84
Oct.	12.80	12.64	12.75/77	12.57
Dec.	13.21	13.04	13.17	12.98
Dec.	12.95	12.79	12.93	12.72/73
Jan.	13.18	13.10	13.24	13.04
Jan.	13.03	12.89	13.02	12.81
Mar.	13.24	13.09	13.19	13.01
May	13.41	13.26	13.35	13.16/17

Cotton Fabrics

DUCKS, DRILLS, AND OSNABURGS. The demand for these types of goods is sluggish. Buyers seem inclined to await developments in the current season's crop growth as to its size and its price. They are expected by the dealers to come into the market for contracts about the middle of August.

RAINCOAT FABRICS. Considerable improvement developed about the middle of the month in materials for raincoats. Manufacturers are inquiring for prices and deliveries on goods, and several fairly good sized contracts have been placed.

SHEETINGS. The market for sheetings has been rather inactive, with requirements purchased only for nearby delivery. The price trend is very close to that of raw cotton, and the market is thus very sensitive to the reported effect of the weather on the growing crop. The effect of the curtailed manufacturing schedule will show a cumulative effect from now forward, and increased business is expected to result.

TIRE FABRICS. Inquiry and sales for these goods were very moderate owing to the reduced scale of tire production. Prices were steady. Fabric mills operated by the large tire manufacturing interests ran during the month on good schedules. Better interest was shown in Egyptian fabric.

Technical Communications

(*Continued from page* 88)

However, it cannot be gainsaid that the purely economic motive for the employment of soft carbons has less force now than at any other time in the history of carbon compounding. The true reason for the maintained popularity of the soft carbons mentioned above is to be found in other directions. In rubber footwear it would be absolutely necessary to use a material of this type even though rubber were available at half the present prices; this for the obvious reason that, when processed, pure rubber compounds are unmanageable. It is true that Micronex will correct these conditions, dry up the stock, prevent book-marking and stretch; but there is a natural upper limit, in the case especially of flexible compounds such as shoe uppers, to the amount of Micronex that can be so employed. That is why there is an increasing demand for Fumonex throughout the footwear industry on both sides of the Atlantic.

Exactly similar conditions obtain in solid and pneumatic tire applications of this pigment. Fumonex is used for the special rubber characteristics which it imparts, reenforcement and development of load carrying capacity, with maintenance of resilience and liveliness. Data from Binney & Smith Co., New York, N. Y.

British Malaya

An official cable from Singapore to the Malayan Information Agency, Malaya House, 57 Charing Cross, London, S.W.1, England, gives the following figures for June, 1930:

RUBBER EXPORTS

Ocean Shipments from Singapore, Penang, Malacca, and Port Swettenham.

To:	June, 1930 Rubber Including Concentrated Latex	Latex and Revertex
United Kingdom	4,673	33
United States	26,491	103
Continent of Europe	4,013	39
British possessions	162	..
Japan	1,037	1
Other countries	105	..
Totals	36,481	176
Total Latex and Revertex	176	..
Grand Total	36,657	..

RUBBER IMPORTS

Actual Imports by Land and Sea

From:	June, 1930 Dry Rubber Tons	Wet Rubber Tons
Sumatra	444	5,142
Dutch Borneo	362	3,837
Java and other Dutch islands	203	61
Sarawak	1,022	18
British Borneo	113	12
Burma	117	26
Siam	112	211
French Indo-China	352	12
Other countries	66	10
Totals	2,791	9,329

Netherlands East Indies Exports

Long Tons

	Calendar Years 1928	1929	1930 Jan.	Feb.	Mar.
Java and Madura	58,848	66,010	5,709	6,900	5,796
Sumatra East Coast	82,511	87,589	7,831	7,191	6,612
Other N. E. I.:*					
Atjeh	4,046	4,193	265	213	253
Riouw	9,533	10,341	105	767	713
Riouw Free Zone	.....	.....	.....	370	202
Djambi	32,807	31,085	2,041	2,242	2,584
Palembang	18,222	22,476	1,152	1,926	1,590
Lampongs	3,015	3,219	308	267	286
Benkoelen	50	47	5	3	4
Sumatra West Coast	1,083	1,283	78	89	73
Tapanoeli	5,757	6,450	247	454	694
Banka	659	846	10	26	62
Billiton	110	124	7	4	10
West Coast Borneo	21,628	26,160	2,127	2,938	2,300
South East Borneo	24,575	29,290	2,105	2,542	2,698
Menado	204	193	20	12	6
Celebes	31	80	7	9	8
Amboino	32	27	4	2	4
Total other N. E. I.	121,752	135,814	8,481	11,864	11,485
Grand totals	263,111	289,413	22,021	25,955	23,893

*Including wet native rubber.

Ceylon Rubber Exports

January 1 to May 7, 1930

To:	Tons
United Kingdom	5,506.43
Continent	2,473.71
Other countries in Europe	22.04
Australia	826.12
America	19,347.14
Canada and Newfoundland	2.50
Other countries in America	55.80
Egypt	5.00
Africa	1.18
India	31.78
Japan	146.34
Other countries in Asia	1.29
Total	28,419.33
For the same period last year	28,611.49

Annual Exports, 1922-1929

	Tons
For the year 1929	80,476.44
1928	57,825.48
1927	55,355.77
1926	58,799.56
1925	45,697.19
1924	37,351.13
1923	37,111.88
1922	47,367.14

World Rubber Shipments—Net Exports

Long Tons

	Calendar Years 1928	1929	1930 Mar.	Apr.	May	June
British Malaya						
Gross Exports	409,500	579,524	47,320	43,813	49,488	36,657
Imports	149,787	161,612	13,236	14,627	13,253	12,120
Net	259,713	417,912	34,084	29,186	36,235	24,537
Ceylon	57,271	80,795	6,617	4,444	5,968	4,152
India and Burma	10,790	11,720	1,129	856	975	†
Sarawak	10,087	11,079	1,081	1,026	917	1,040
Br. No. Borneo	6,698	7,381	*600	*600	*600	*600
Siam	4,813	5,024	399	428	382	323
Java and Madura	58,848	66,010	5,796	4,802	6,352	†
Sumatra E. Coast	82,511	87,589	6,612	6,326	6,661	†
Other N. E. Indies	121,671	134,732	11,070	12,582	11,916	†
French Indo-China	9,616	10,147	643	433	753	425
Amazon Valley	21,129	21,148	1,674	1,201	1,383	974
Other America	1,490	996	80	97	83	†
Mexican Guayule	3,076	1,275	148	75	172	†
Africa	6,124	4,596	308	*300	*300	†
Totals	653,837	860,404	70,241	62,356	72,697	.....

*Estimate. †Not available.
Compiled by Rubber Division, Department of Commerce, Washington, D. C.

World Rubber Absorption—Net Imports

Long Tons

	Calendar Years 1928	1929	1930 Feb.	Mar.	Apr.	May
Consumption						
United States	441,400	528,608	40,793	42,216	43,036	40,459
United Kingdom	48,504	122,675	10,923	12,346	13,058	9,861
Net Imports						
Australia	8,430	15,886	457	975	673	‡
Austria	3,043	3,324	284	160	337	274
Belgium	7,958	9,445	1,143	678	1,431	‡
Canada	30,447	35,453	2,250	3,776	2,303	2,593
Czechoslovakia	3,138	4,650	239	263	255	‡
Denmark	566	799	127	43	105	21
Finland	768	976	60	75	57	96
France	36,498	59,342	4,482	4,354	4,962	‡
Germany	37,855	49,078	3,697	4,289	4,488	4,379
Italy	12,433	17,169	1,385	1,083	2,067	1,279
Japan	25,621	34,284	1,386	2,485	2,584	‡
Netherlands	2,243	3,022	188	358	158	230
Norway	728	813	35	72	91	‡
Russia	15,134	12,626	2,128	948	*1,000	‡
Spain	.....	2,400	*200	*200	*200	‡
Sweden	2,356	3,857	93	132	207	100
Switzerland	566	653	43	85	27	69
Others estimated†	8,000	.....	.....	.....	.....	‡
Grand totals	685,688	905,060	69,913	74,538	77,039	‡
Minus United States	441,400	528,608	40,793	42,216	43,036	40,459
Total foreign	244,288	376,452	29,120	32,322	34,003	‡

*Estimate to complete table. †Includes Argentina, Brazil, Chile, China, Cuba, Egypt, Estonia, Hungary, Latvia, Mexico, Poland, Portugal, Spain, and Union of South Africa. ‡Not available.
Compiled by Rubber Division, Department of Commerce, Washington, D. C.

Reported Rubber Stocks

Producing Centers	Long Tons 1929 Nov.	Dec.	Long Tons 1930 Feb.	Mar.	Apr.	May
Singapore	25,974	27,949	32,074	32,629	34,005	33,302
Penang	4,989	5,208	5,476	5,500	5,575	5,272
Para	3,237	3,103	3,545	3,596	3,596	3,349
Totals	34,200	36,260	41,095	41,725	43,176	41,923
Manufacturing Centers						
London	52,454	54,304	64,557	68,923	74,676	77,312
Liverpool	17,655	18,949	20,605	21,098	23,849	25,415
Amsterdam	2,150	2,179	2,159	2,220	2,204	2,308
United States	92,219	105,138	131,748	141,843	148,272	146,179
Plantations afloat*	88,869	90,840	97,931	96,297	85,875	85,835
Totals	253,347	271,410	317,000	330,381	334,876	337,049
Grand totals	287,547	307,670	358,095	372,106	378,052	378,972

*W. H. Rickinson & Son. *The World's Rubber Position.*
Compiled by Rubber Division, Department of Commerce, Washington, D. C.

London Stocks, May, 1930

London	Landed for May Tons	Delivered for May Tons	Stocks May 31 1930 Tons	1929 Tons	1928 Tons
Plantation	9,992	7,376	77,206	31,129	44,472
Other grades	27	18	52	86	89
Liverpool					
Plantation	†2,520	†954	†25,415	†4,538	†2,254
Total tons, London and Liverpool	12,539	8,348	102,673	35,753	46,815

† Official returns from the recognized public warehouses.

United States Statistics

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	April, 1930		Four Months Ended April, 1930	
	Pounds	Value	Pounds	Value
UNMANUFACTURED—*Free*				
Crude rubber	101,747,286	$14,783,605	404,501,888	$62,028,202
Liquid latex	505,168	98,239	2,738,928	554,637
Jelutong or Pontianak	919,292	103,089	4,051,051	466,404
Balata	129,943	54,548	346,911	140,914
Gutta percha	11,932	3,182	11,932	3,182
Guayule	168,000	19,856	1,006,591	151,540
Siak, scrap and reclaimed	1,019,672	14,209	3,730,008	57,690
Totals	104,501,293	$15,076,728	416,387,309	$63,402,569
Chicle ...*Dutiable*	2,386,736	$1,235,575	6,280,712	$3,240,655
MANUFACTURED—*Dutiable*				
Belting	1,554	456	3,474	1,825
Tires ...*number*	511	9,198	1,584	38,839
Other rubber manufactures	.....	126,885	.....	532,278
Totals	.....	$136,539	.....	$572,942

EXPORTS OF FOREIGN MERCHANDISE

RUBBER AND MANUFACTURES				
Crude rubber	6,021,817	$892,532	25,308,867	$4,123,445
Balata	73,315	38,020	1,044,472	221,701
Gutta percha, rubber substitutes, and scrap	.....	.....	24,224	869
Rubber manufactures	.....	46,021	.....	63,961
Totals	6,095,132	$976,573	26,377,563	$4,409,976

EXPORTS OF DOMESTIC MERCHANDISE

MANUFACTURED				
Reclaimed	1,657,913	$100,944	8,838,252	$547,872
Scrap and old	4,520,786	177,615	19,112,653	764,962
Rubberized automobile cloth ...*sq. yd.*	107,469	58,024	448,768	237,165
Other rubberized piece goods and hospital sheeting...*sq. yd.*	135,996	61,162	531,369	223,211
Footwear				
Boots ...*pairs*	58,410	141,255	243,687	545,954
Shoes ...*pairs*	85,611	60,088	469,297	461,881
Canvas shoes with rubber soles ...*pairs*	583,707	380,228	1,803,269	1,221,954
Soles ...*doz. pairs*	7,666	22,148	46,412	134,432
Heels ...*doz. pairs*	93,518	67,900	419,327	295,212
Water bottles and fountain syringes ...*number*	25,162	16,068	120,523	63,376
Gloves ...*doz. pairs*	11,552	29,197	41,520	107,551
Other druggists' sundries	.....	28,281	.....	106,578
Balloons ...*gross*	51,533	56,783	248,216	256,073
Toys and balls	.....	12,275	.....	36,779
Bathing caps ...*doz.*	31,251	55,540	96,520	203,859
Bands	75,705	35,356	229,284	106,721
Erasers	61,401	37,697	188,749	113,488
Hard rubber goods				
Electrical goods	68,713	7,893	430,374	66,792
Other goods	.....	31,520	.....	142,610
Tires				
Truck and bus casings, *number*	40,379	964,154	158,164	3,688,892
Other automobile casings ...*number*	206,684	1,778,216	739,191	6,396,578
Tubes, auto...*number*	147,254	259,778	549,878	972,942
Other casings and tubes *number*	9,532	30,386	28,448	91,721
Solid tires for automobiles and motor trucks..*number*	2,728	88,735	11,039	354,911
Other solid tires	136,723	22,821	521,738	94,709
Tire accessories	.....	129,492	.....	451,527
Rubber and friction tape	145,003	39,176	512,474	140,408
Belting	376,545	188,824	1,712,454	869,036
Hose	664,584	236,298	2,890,436	994,372
Packing	195,978	84,261	720,852	339,951
Thread	109,750	107,939	632,586	612,951
Other rubber manufactures	.....	258,658	.....	955,181
Totals	.....	$5,568,712	.....	$21,599,649

Crude Rubber Imports by Customs Districts

	*May, 1930		Five Months Ended *May, 1930	
	Pounds	Value	Pounds	Value
Massachusetts	2,720,852	$422,429	17,505,990	$2,903,448
New York	75,504,663	10,787,558	422,113,691	64,307,683
Philadelphia	1,390,671	204,265	5,646,723	815,763
Maryland	381,550	50,016	3,097,320	405,507
Virginia	103,267	12,275	865,361	109,275
Georgia	641,161	81,558	3,123,639	396,476
Los Angeles	11,132,046	1,459,349	35,320,183	5,012,054
San Francisco	160,270	25,508	758,918	120,173
Oregon	11,254	1,623	67,288	11,299
Indiana	324,740	40,599	324,740	40,599
Wisconsin	.....	.....	266,180	44,792
Dakota	.....	.....	42,590	6,288
Ohio	3,539,526	472,714	12,835,336	1,782,553
Colorado	396,480	57,723	1,579,337	242,546
Totals	96,306,480	$13,615,617	503,547,296	$76,198,456

*Including latex, dry rubber content.

United Kingdom Statistics

IMPORTS

	May, 1930		Five Months Ended May, 1930	
UNMANUFACTURED				
Crude Rubber				
From—	Pounds	Value	Pounds	Value
Straits Settlements	15,018,000	£455,162	83,195,400	£2,673,163
Federated Malay States	6,899,200	207,094	34,189,100	1,100,032
British India	858,300	24,356	7,434,800	240,012
Ceylon and Dependencies	1,578,100	46,724	14,894,000	479,347
Java and Dutch Borneo	3,327,700	104,631	14,016,800	459,435
Sumatra and other Dutch possessions in Indian Seas	2,055,800	64,573	9,550,600	316,286
Other countries in East Indies and Pacific, not elsewhere specified	304,300	9,166	1,597,900	52,593
Brazil	625,700	19,881	2,808,800	92,599
South and Central America (except Brazil)	.....	.....	122,200	3,719
West Africa				
French West and Equatorial Africa	8,300	258	146,800	4,769
Gold Coast	44,300	1,282	186,100	5,827
Other parts of West Africa	320,200	9,691	826,300	28,096
East Africa, including Madagascar	56,800	1,639	360,800	11,517
Other countries	125,600	3,566	1,201,400	41,526
Totals	31,222,300	£948,023	170,531,000	£5,508,921
Gutta percha and balata	421,600	27,449	2,283,400	175,645
Waste and reclaimed rubber	758,000	9,333	4,064,500	51,380
Rubber substitutes	9,000	226	81,500	1,619
Totals	32,410,900	£985,031	176,960,400	£5,737,565
MANUFACTURED				
*Tires and tubes				
Pneumatic				
Outer covers	.....	£26,531	.....	£138,118
Inner tubes	.....	6,314	.....	34,036
Solid tires	.....	4,966	.....	19,726
Boots and shoes...*doz. pairs*	175,836	181,136	769,512	810,108
Other rubber manufactures	.....	227,736	.....	1,096,231
Totals	.....	£446,683	.....	£2,098,219

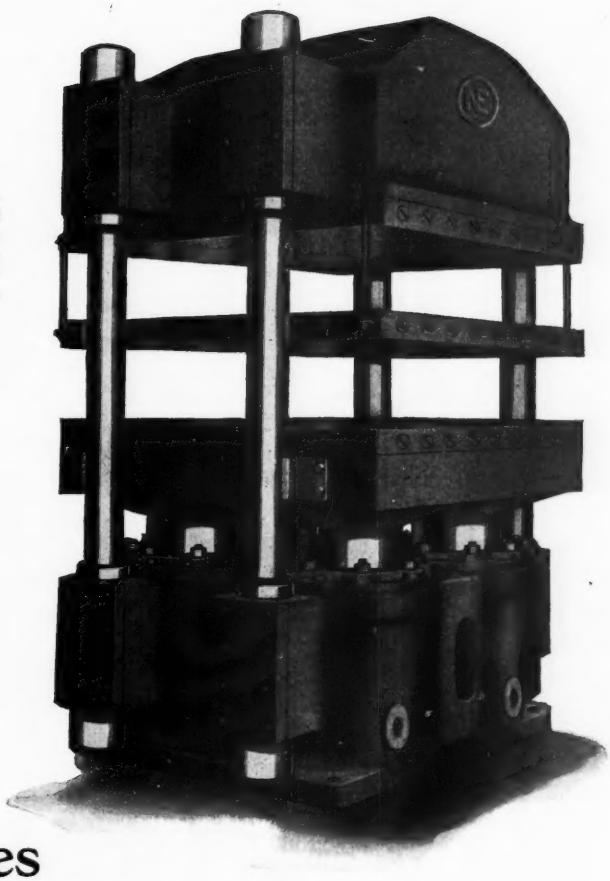
EXPORTS

UNMANUFACTURED				
Waste and reclaimed rubber	2,144,800	£17,177	10,307,500	£81,384
Rubber substitutes	32,000	673	223,900	4,826
Totals	2,176,800	£17,850	10,531,400	£86,210
MANUFACTURED				
Tires and tubes				
Pneumatic				
Outer covers	.....	£380,565	.....	£1,846,274
Inner tubes	.....	54,509	.....	261,803
Solid tires	.....	8,319	.....	39,161
Boots and shoes...*doz. pairs*	23,709	31,010	117,482	159,514
Other rubber manufactures	.....	246,392	.....	1,115,303
Totals	.....	£720,795	.....	£3,422,055

EXPORTS—COLONIAL AND FOREIGN

UNMANUFACTURED				
Crude Rubber				
To—				
Russia	1,065,300	£36,306	8,024,600	£304,089
Sweden, Norway, and Denmark	256,500	10,501	801,500	34,179
Germany	3,046,200	99,033	12,766,200	424,651
Belgium	806,600	27,508	3,447,700	124,623
France	2,644,200	97,827	10,383,500	393,108
Spain	37,700	1,974	315,700	14,136
Italy	545,900	19,429	1,782,000	63,732
Other European countries	337,400	16,125	1,687,200	74,362
United States	231,800	6,898	2,321,700	71,066
Other countries	162,000	7,455	661,000	31,651
Totals	9,133,600	£323,056	42,191,100	£1,535,597
Gutta percha and balata	65,200	5,027	302,500	25,270
Waste and reclaimed rubber	11,000	195	28,700	602
Rubber substitutes	.....	.....	1,500	30
Totals	9,209,800	£328,278	42,523,800	£1,561,499
MANUFACTURED				
Tires and tubes				
Pneumatic				
Outer covers	.....	£7,095	.....	£23,988
Inner tubes	.....	759	.....	3,292
Solid tires	.....	10	.....	85
Boots and shoes...*doz. pairs*	3,655	6,453	10,959	19,519
Other rubber manufactures	.....	5,992	.....	33,400
Totals	.....	£20,309	.....	£80,284

* Motor cars, motorcycles, parts, and accessories, liable to duty from Sept. 29, 1915, until Aug. 1, 1924, inclusive, and after July 1, 1925. Commercial vehicles, parts, and accessories were exempt from duty until April 30, 1926, inclusive, and rubber tires and tubes until April 11, 1927, inclusive.



Extremely simple and sturdy—entirely of steel — combined with every modern improvement for increased production, and lower operating costs — NATIONAL-ERIE Platen Press.

3 Facts you should know about Platen Presses

SOONER or later, you'll be buying another platen press — so it will pay you to check these facts, and find out which is *the most Efficient and Reliable press built:*

1. You get unequalled sturdiness, that assures absolute rigidity under the most severe working conditions, in the NATIONAL-ERIE Press. For instance, the cylinder, of top-packed design, is cast steel with extra large strain rod lugs—cross-heads and ram heads are also of cast steel, box type, well ribbed to assure maximum strength and minimum deflection.
2. You get uniform cure. The "Akron" Swing Joints used on NATIONAL-ERIE presses are a valuable aid for holding uniform heat and pressure, necessary for uniform curing. Also saves the time formerly spent in tightening leaks.
3. You get much greater curing capacity with NATIONAL-ERIE platens—of rolled steel, only about a third as thick as cast iron platens. Far more platens can be used in the same press frame. These platens speed up the cure, as they heat and cool much faster.

Write for description of the NATIONAL-ERIE Platen Press, and other NATIONAL-ERIE Rubber processing machinery — tubers, strainers, calenders, mills, etc. *The line is complete*, and every machine is designed and built to the highest standard.

NATIONAL-ERIE COMPANY
1000 West 16th St., Erie, Pa.
Williams Foundry and Machine Division

NE A-W

YOUR MONEY MAKERS

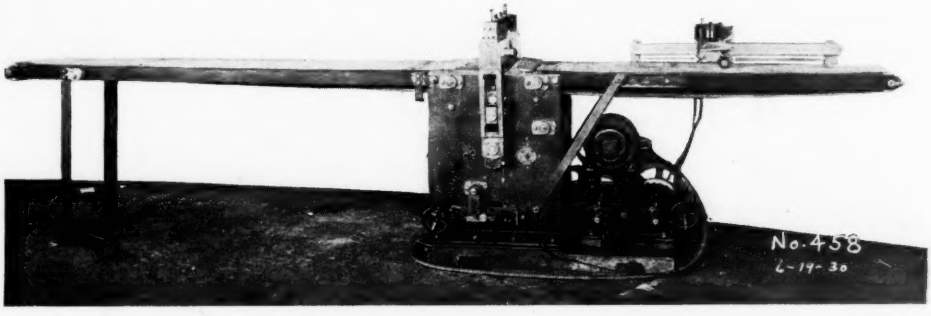
Utility Automatic Measuring and Cutting Machine

This machine will measure and cut all kinds of raw and cured rubber stock as well as fabrics.

It will measure and cut to length raw inner tubes and open the ends thereof.

Stock travels continuously and does not stop for the cutting operation.

Machine can readily be placed in your conveyor line.



Built in various cutting widths to suit your requirements.

Wide range of speed variation is obtainable and length of cut can be changed while machine is in operation.

Machine is built in two types, for square cut and for skive cut.

We will cooperate with you on your cutting problems.

UTILITY MANUFACTURING COMPANY

CUDAHY, WISCONSIN

WALTER SCHEFFLER
633 East Exchange Street
Akron, Ohio
Phone: Main 3600

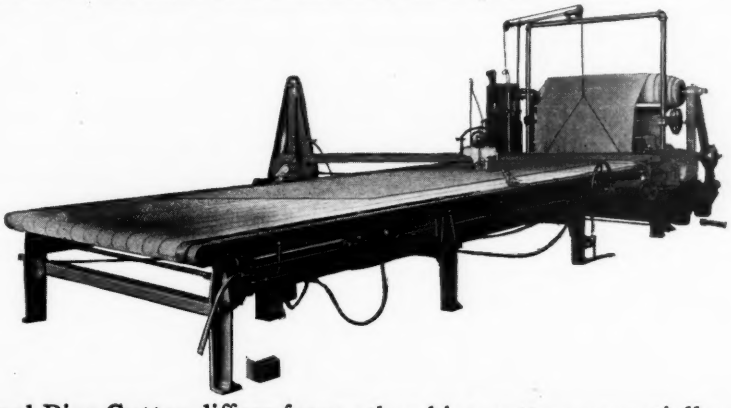
Registered Cable Address: Utility—Milwaukee
Bentley's Code

California Representatives:
LOMBARD SMITH COMPANY
324 No. San Pedro St.
Los Angeles, Calif.
Phone: Tucker 8917

Business Ills Are Cured by the Elimination of Waste —*Not by Wage Cuts*

THIS is the consensus of opinion of a cross-section of the largest employers of labor. In the tire industry labor productivity has been increased more than two hundred per cent during the last ten years but there are numerous places where waste of material still lurks.

In many stock preparation departments the savings to be made by accurate cutting and elimination of stock storage will more than offset the cost of factory supervision. The National Bias Cutter is the means of effecting this economy. Twenty-five tire manufacturers have already adopted it and by doing so have stopped losses which had been considered as unpreventable.



The National Bias Cutter differs from other bias cutters essentially as follows:

CUTTING ACCURACY is the prime requisite of a bias cutting machine. All other advantages cease to be of importance if the cut strips vary in width from end to end, and if the duplication of widths is not precise. In accurate cutting lies the greatest economy.

VARIOUS PLY WIDTHS can be cut consecutively without decreasing the number of cuts per minute, and this feature permits a degree of flexibility in preparation of stock which heretofore has never been realized. Cut the stock as required and in the order in which it is used.

ADAPTABILITY to stock preparation methods is another big point. Tire building, pocket making, splicing, and other operations can be combined directly with the National Bias Cutter, resulting in a very substantial saving in labor, the elimination of liners, the prevention of an off-balanced stock which invariably delays fabrication operations. The same supervision can oversee both bias cutting and fabrication.

A GIRL easily operates the National Bias Cutter, the stripping of the stock from the liner being automatically controlled, and the cut stock travels away without attention. More cuts per labor hour are obtainable.

MAINTENANCE of the National Bias Cutter is a minor factor and the wearing of parts will not affect the cutting accuracy.

ANGLE CHANGING is a simple and quick adjustment.

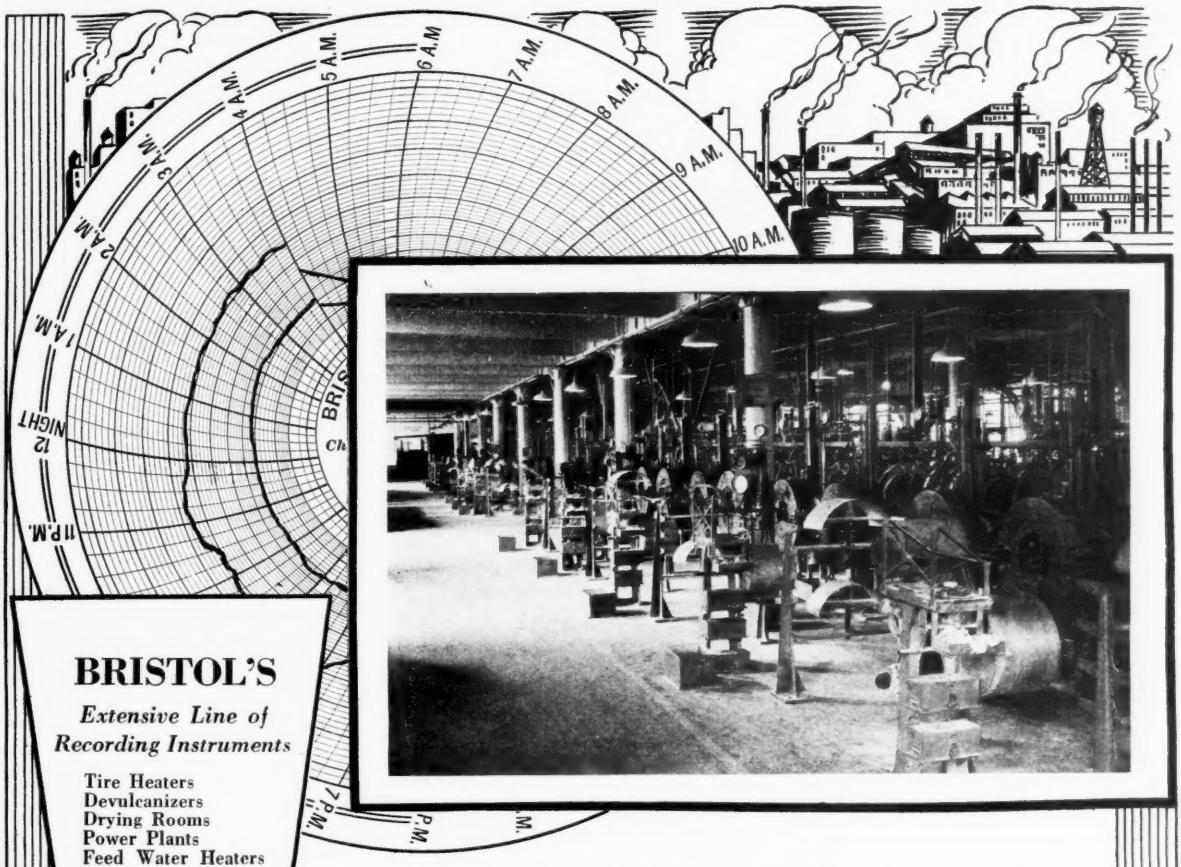
CUTTING RANGE up to 144" blocks.

EASE OF OPERATION is at once noticeable. Skilled labor is not required. Several days make an experienced operator.

NATIONAL RUBBER MACHINERY COMPANY

AKRON, OHIO

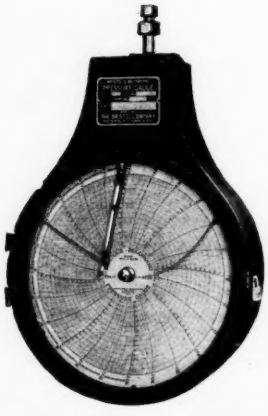
"In business to reduce your costs"



BRISTOL'S

Extensive Line of Recording Instruments

Tire Heaters
Devulcanizers
Drying Rooms
Power Plants
Feed Water Heaters
Presses
Tube Heaters
Bead Presses
Hot Wells
Vacuum Dryers



IN these days of quick curing, the highly accelerated rubber stock is particularly sensitive to heat. Inner tubes are no exception and the most exact regulation of curing conditions is necessary.

Bristol Instruments record the temperature and pressure with the increases and decreases throughout the curing cycle thus controlling the most important process in the manufacture of rubber goods.

For over forty years Bristol has supplied complete and valuable information for the many processes in a rubber factory, aiding the manufacturer in controlling quality and uniformity and helping to eliminate costly adjustments.

Our engineers are at your service without obligation.

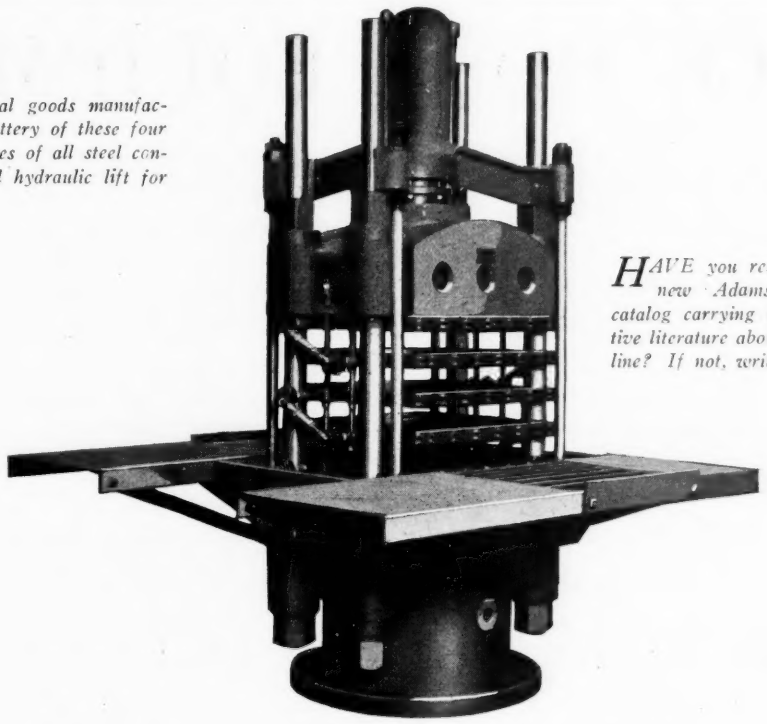
THE BRISTOL COMPANY

WATERBURY, CONN.

Akron	St. Louis	Chicago	Philadelphia
Detroit	Boston	San Francisco	Birmingham
Denver	New York	Los Angeles	Pittsburgh

BRISTOL'S
RECORDING INSTRUMENTS

AN Akron mechanical goods manufacturer ordered a battery of these four opening 30 by 30 presses of all steel construction with overhead hydraulic lift for double tables.



HAVE you received your copy of the new Adamson Machine Company catalog carrying illustrations and descriptive literature about the complete Adamson line? If not, write now.

In Record Time

SPEED is an essential requisite in successful equipment manufacture along with high grade workmanship and quality materials.

Adamson engineers were put to a speed test when they were recently called in by one of Akron's largest mechanical rubber goods manufacturers to design the special type hydraulic press illustrated herewith.

The press was designed, proven, and turned out complete in the Adamson shops; castings and all, in rapid-fire order. A battery of four of these presses is now doing a record job each day on its operation.

The press shown has four openings, is of all steel construction and features an overhead hydraulic lift for the presses' double tables. The platens are of drilled steel and the size 30 by 30 inches.

ENGINEERS — MACHINISTS — IRON AND STEEL FOUNDERS

The ADAMSON MACHINE COMPANY

AKRON OHIO

Perhaps this Laboratory Holds a Secret
FOR REDUCING YOUR COSTS

TO the maker of rubber goods, as an individual manufacturer, we are glad to offer the same laboratory service we have offered to the industry in general.

In Philadelphia Rubber Works laboratories more than 39,000 distinct experiments have been made. Most of these were made for improving the quality of reclaim—and its *uniformity*. Reclaim today is a different product from the reclaim of a few years ago. This is true to such an extent, it has been found to be actually the *best* material for some purposes. These experiments have benefited not only ourselves but also users of reclaim; we are indeed proud of our contribution to the rubber industry.

Some of our experiments, however, were carried on to solve problems of particular customers — problems of adapting their processes to the use of reclaim — of overcoming manufacturing difficulties, improving products, lowering costs. These have been so extensive that the answers to many common questions are already on file.

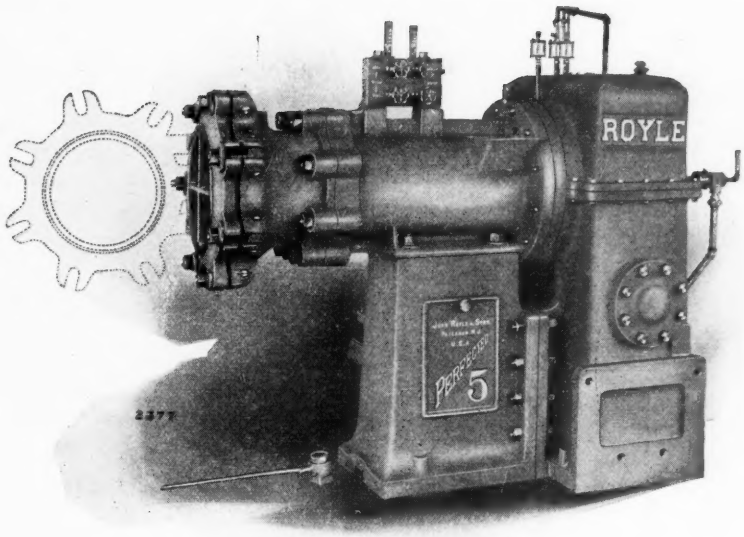
Have you a problem which Philadelphia reclaim or Philadelphia laboratories might help solve? Why not write to us?

The Philadelphia Rubber Works Company, Akron, Ohio. New York, 52 Vanderbilt Avenue. European agents: Wm. Somerville Sons Rubber Company, Ltd., Aldwych House, London, England. Works and laboratories at Akron, Ohio, and Oaks, Pennsylvania.

Photo shows a view of one room in the Philadelphia Akron laboratories. Complete laboratories are maintained both in Akron, Ohio, and Oaks, Pennsylvania.

A.M.I. REG. U.S. PAT. OFF. TRADE MARK
RECLAIMED RUBBER

PHILADELPHIA
Reclaimed Rubber



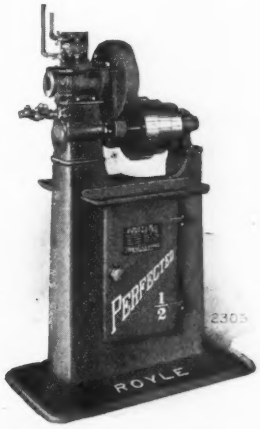
No. 5 Rubber Straining Machine. 5000 pounds of reclaim per hour.

ROYLE TUBING AND STRAINING MACHINES

Made in many sizes and types to meet every requirement of the plant or laboratory.

Royle machines are known for high production and long life.

We suggest you talk with our engineers before placing equipment orders.

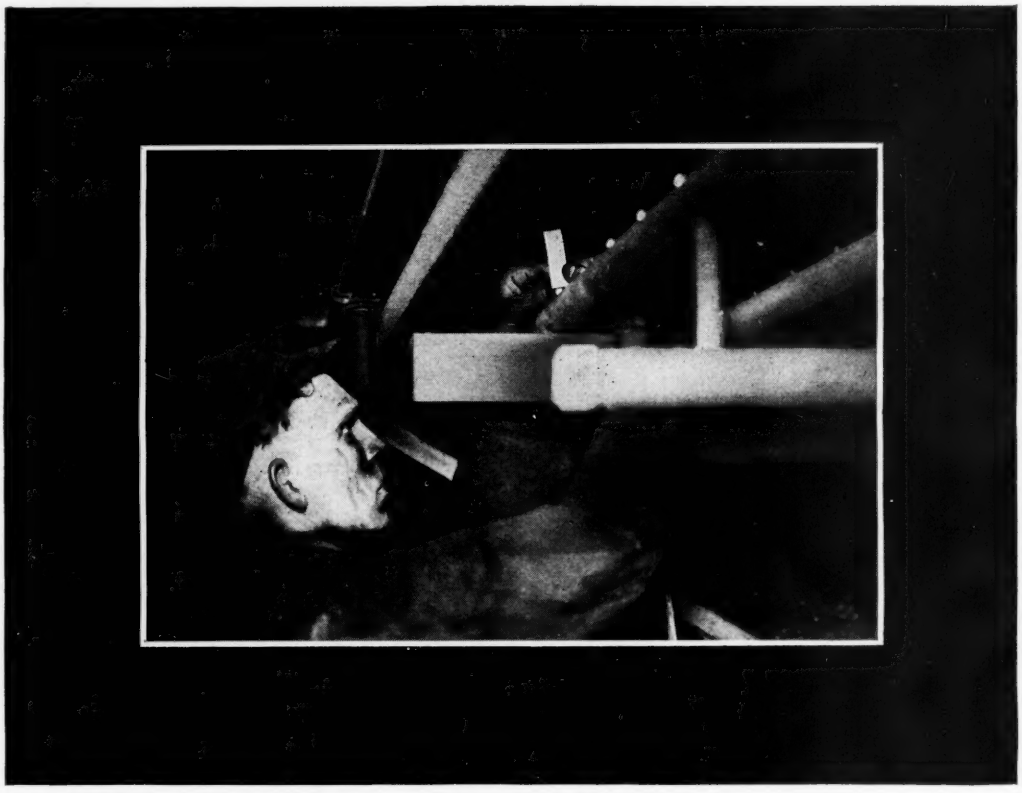


No. ½ Tuber for experimental or productive work.

JOHN ROYLE & SONS

PATERSON, NEW JERSEY, U. S. A.

Makers of Royle Hose Looms for fire, gasoline, and similar hose



A HAIR'S BREADTH BUT OF VITAL IMPORTANCE

In the manufacture of Carbon Black, the natural gas flame is allowed to impinge on a cooled surface. The quality of Black varies with the distance of burners from this surface. There is an 'optimum position'. The slightest deviation from this optimum position means a Black coarser, grayer, or with less reinforcing action. Briefly, a Black unsuitable for the purpose for which it was designed. *The distance which produces the highest quality rarely, if ever, produces the highest yield.* The United Carbon Company places the burners at the optimum position, sacrificing a possible increased yield, to insure the highest quality. The burners are carefully adjusted, rigidly bolted in place and periodically inspected. It is impossible for them to move more than one one-hundredth of an inch. This precision, exercised at every point in our operations, enables us to offer you exceptional quality and unexcelled uniformity.

United Carbon Company: 614 New York Central Building, New York City; 844 Rush Street, Chicago, Ill.; 308 Akron Savings and Loan Bldg., Akron, O.; 149 California St., San Francisco, Cal. In Canada: Canadian Industries Ltd., Sterling Tower Bldg., Toronto 2, Canada. In England: Chance & Hunt, 5-7 St. Helens Place, London; United Oil & Natural Gas Products Corporation, Manchester.

UNITED CARBON COMPANY

CHARLESTON, WEST VIRGINIA

For maximum wear in your tire treads we recommend Kosmos. This high grade black has achieved an enviable reputation. The high unvarying standard of this Black justifies its general acceptance throughout the trade.

KOSMOS BRAND

Southwark Hydraulic Rubber Shear

The Hydraulic Guillotine Shear illustrated above cuts rubber bales of all grades—Automatic feed and hold down—Fast and Efficient.

SOUTHWARK SPECIAL HYDRAULIC EQUIPMENT

Routine and production methods vary in different plants to such an extent that no standard hydraulic machine will suit every manufacturer's requirements.

Nearly all Southwark Hydraulic Equipment is designed especially for the work on which it is to be used. This is one reason why the largest and best known plants specify Southwark Hydraulic Equipment.

The long experience Southwark Engineers have had in designing machinery for special purposes or in modifying and adapting existing apparatus to the work at hand, is available to you. Let us know what your problems are.

Builders of

FORGED STEEL TIRE MOLDS
ROLLED STEEL STEAM PLATENS
MULTIPLE STEAM PLATEN PRESSES for MOLDED RUBBER PRODUCTS
"HYLO" PUMPING UNITS

Send for Catalog

ESTABLISHED IN 1836

SOUTHWARK FOUNDRY AND MACHINE CO. ESTABLISHED 1836 PHILADELPHIA, PA.

408 WASHINGTON AVENUE

CHICAGO Fisher Building

AKRON United Building

PEQUANOC RUBBER CO.

MANUFACTURERS OF RECLAIMED RUBBER

TELEPHONE 400 BUTLER
CABLE ADDRESS
"PEQUANOC" BUTLERNJ
A B C CODE 4TH & 5TH EDITIONS

Main Street
Butler, New Jersey
August 7, 1930

Dear Mr. Advertising Editor:

So you want our advertisin' matter for September? Ain't dat sumpin!

First, before we took pen in hand to answer, we read what the other fellow was sayin', and don't it sound pretty! One says he's more reliable than anybody ever could or can be, another says he's so old at the business he can't count back far 'nough, and another broadcasts as how he can make you prosperous if you will just turn over the runnin' of your factory to his laboratory. Um! um!

And, here's another as says how he invented the word "Quality"; still another asserts that 10,000 lbs. tensile don't mean a thing in his young life. Seems as though all the nice advertisin' words was used up.

We've been livin' in Butler thirty years come Sunday, workin' on this and that, goin' hither and yon makin' a few friends, turnin' out some pretty good stocks and addin' a new one now an' agin, payin' our bills reg'lar, and when a body comes to see us all hot and bothered about his troubles, why we just get our legs under a table friendly like and usually he goes home feelin' better and that things will come out all right.

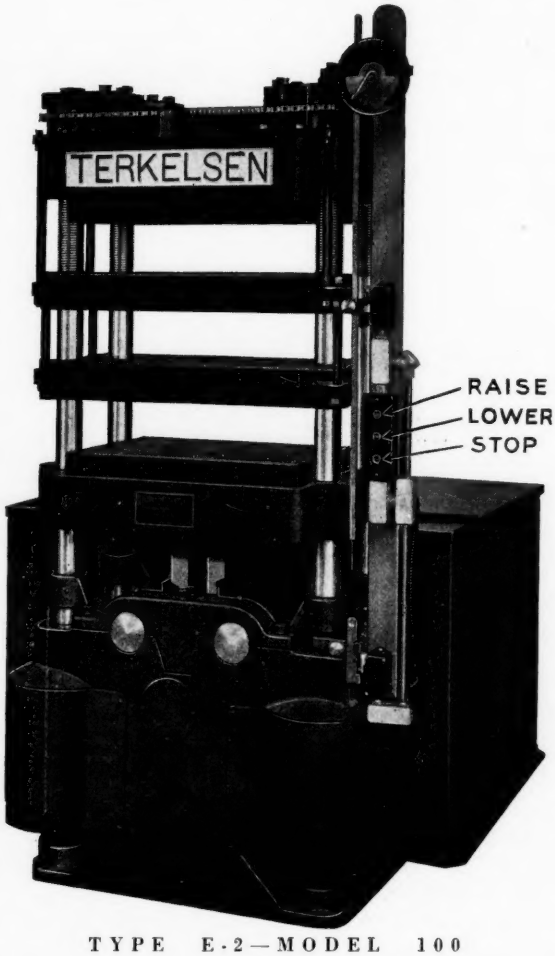
Please count us out of this struggle for advertisin' supremacy, and just say we got a post office and a telephone, and now's a good time to buy reclaim at low prices - an' it's a sin an' a shame how low they be.

Yours,

Wigwam Chief

PEQUANOC RUBBER COMPANY

TERKELSEN ELECTRO-DRAULIC PRESS



TYPE E-2—MODEL 100

TERKELSEN ELECTRO-DRAULIC RUBBER PRESS

Capacity	100 tons
Platens	24″ x 24″
Stroke	16″
Daylight opening—3-opening	6″

THIS PRESS has been developed for the most efficient molding of Mechanical Rubber Goods—a complete self-contained unit, not requiring any expensive accessories of any kind.

AN INSTALLATION MEANS DEFINITE SAVINGS

No power consumption during curing period—a saving of 40% to 60%.

Constant operation, elimination of shutdowns—a saving of 50% to 80% in maintainance and an increase of 5% to 10% in operating hours.

A decided saving in steam consumption because of less radiation of heat.

Eliminates necessity of pumps, accumulators, expensive valves and high pressure pipe lines.

Eliminates all leaks, assuring a clean, wholesome plant to work in.

Uniform, constant pressure at all times assures a quality product and means a saving in materials and reduces rejections to a minimum.

SAVES ITS OWN COST IN OPERATING ECONOMY

Submit your specifications to us and we will be pleased to quote you prices and send complete information.

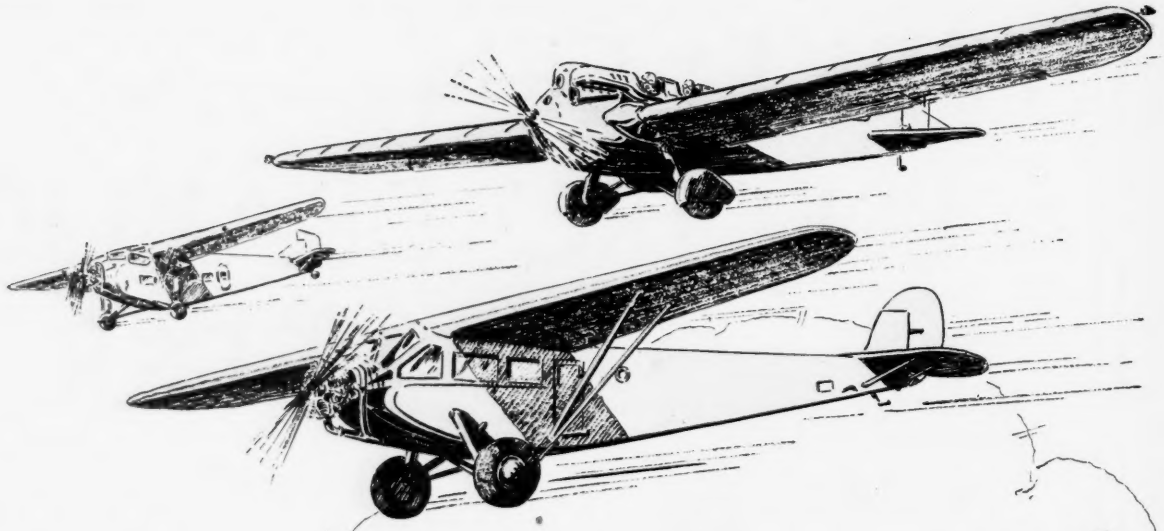
Greater Tonnages
Larger Platens
More Openings
Readily Furnished

TERKELSEN MACHINE COMPANY

328 A STREET BOSTON, MASS., U. S. A.

Foreign Representatives

FRANCIS PAISLEY, 76, Maryon Rd., London, S.E.7, England
AMERICAN INSULATING & MACHINERY CO., 8, Rue Auguste Chabrieres, Paris (XV^e), France
ERNST ROSENBERG & CO., Genthiner Str., 38, Berlin, Germany



"Aerfloted"
is still supreme

SIX years ago, Huber upset all existing carbon black standards of freedom from grit by the introduction of the air principle of grit separation. Gradually the rest of the industry has followed in abandoning the old-fashioned pan-bolters, with erosive brush action.

"Aerflotation", by Huber, has progressed steadily. The high speed centrifugal air-bolter, now in general use, is no longer sufficient by itself to safeguard the leadership of "Aerfloted" black.

The Huber refining system now utilizes *three* such bolters, in series, instead of a single one. The results are almost in direct proportion:—Aerfloted Arrow Black averages only ⅓ the grit content of the ordinary carbon black on the market. Test it yourself on 100 mesh screen.

A foreign particle in carbon black may mean a weak spot in a tire tread. Play safe with Aerfloted Arrow Black!

aerfloted
ARROW
BLACK

J. M. HUBER, Inc.
460 West 34th Street, New York